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OVER THE TOP

●

When you have made your compound the best you know how with rubber, plasticizer, filler, accelerator, antioxidant, and whatever else you have in mind and still it falls short of meeting the requirements specified or service expected—then adjust your vulcanizing

(go to low sulphur)

and accelerating materials as may be needed and add

TELLOY

for lower cold flow, lower permanent set, higher modulus, greater resistance to reversion in heat and for real super aging.

●

R. T. VANDERBILT CO., 230 PARK AVENUE, NEW YORK

INDIA RUBBER WORLD

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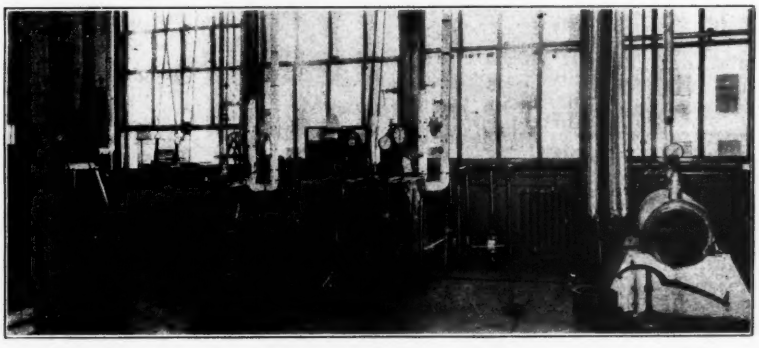
Volume 97 | **New York, November 1, 1937** | **Number 2**

Rubatex

A Cell-Tight Expanded Rubber

E. V. Osberg

RUBATEX is the trade name for all articles and materials of expanded cell-tight rubber made under the Denton and supplementing processes owned by Rubatex Products, Inc. Onazote is the name used to describe this material manufactured in England. Rubatex is made in the form of cellular ebonite and also as a soft material somewhat resembling sponge rubber.



Gassing Chambers in Laboratory of Rubatex Products, Inc., New York, N. Y.

The characteristic of all such processed substances is that of a cellular or cell-tight structure with confined gas in small cells or globules, like tiny balloons held together with rubber membranes to form a mass. For this reason it is sometimes referred to as "Bubble Rubber." This structure results in a non-water-absorbing product of very light weight with high insulating value.

Historical Development

The first known discovery of expanded rubber was made about thirty years ago by Hans Pflumer in Dresden, Germany. He with two brothers was experimenting in an attempt to produce a puncture-proof tire. Cut pieces of rubber were placed in solvents and agitated as the rubber dissolved, after which a gas was introduced under extreme pressure in an autoclave. Pflumer describes the discovery by relating that on removal one day some extra large pieces of rubber had not dissolved, and in each piece there was evidence of escaping gas from within. After a short time the piece of rubber had gradually collapsed to its original size. This observation led Pflumer to believe that undissolved rubber could be impregnated with gas, and through proper vulcanizing, while the rubber was under gas pressure, he was able to retain the gas within the rubber.

The Pflumer brothers had visions of a new product with remarkable properties. They had produced a material which because of its gas content had great insulation value against cold. The light weight and waterproof characteristics made the material of value for flotation.

Many difficulties presented themselves, however, in the making of a commercial product. The necessity of high pressures with gas forced the brothers to work with slow operating compressors using a column of water and a water pump to force the gas into the autoclave where the pressure was applied to the rubber. The gassing chamber itself was a crude affair consisting of a tube with covers bolted on both ends. The gases they wished to use were expensive and difficult to obtain for commercial manufacture.

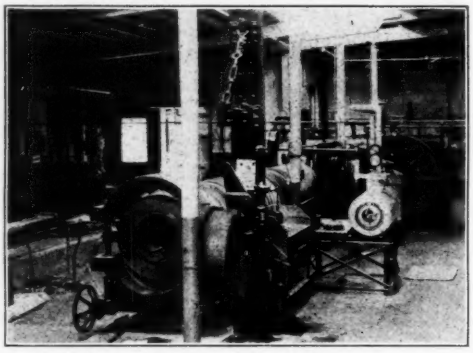
Nevertheless Hans Pflumer came to this country in 1911 bringing with him samples of expanded rubber. He attempted to manufacture here on a commercial scale. The World War interfered with his plans, and the Pflumer

patents expired with no profit being realized by the inventors. Two years ago Hans Pflumer was discovered working as a skilled mechanic in a New Jersey machine shop. He is now an engineer with Rubatex Products, Inc., at its New York laboratory, and since his affiliation he has aided materially in the development of the present product.

The next significant step was made in England around 1930 when the Denton process[1] was introduced. An English company was formed to use this process commercially, and a factory was established near London for that purpose. The operation until recently has been on a small scale; the manufacture is confined largely to hard board for insulation and soft rubber for mats and balls.

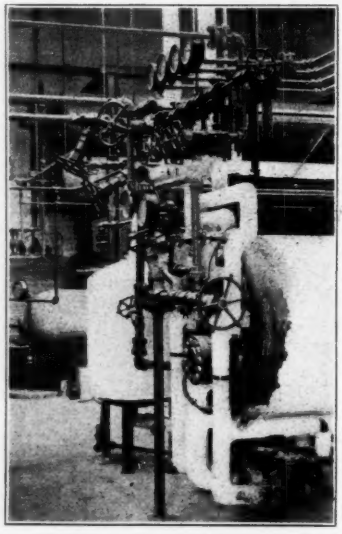
In 1933 a group of New York financiers became interested in the English product and formed a company for research and development. A pilot plant was set up at Baltimore to act both as factory and laboratory. A license was then taken from the English company (Expanded Rubber Co.) to operate under the patents which were more recently acquired. Later a factory was obtained at Bedford, Va., and a laboratory established in New York, N. Y. The Expanded Rubber Co. of England was also purchased. The Bedford factory has been sold to an active manufacturer now operating under the name of Virginia Rubatax Corp.; the Expanded Rubber Co. has been sold to an English group, which in turn has purchased a larger factory for extensive expansion. In this country licenses have been granted to Michigan Rubatex Corp., Port Clinton, O., a subsidiary of Standard Products Co.; Sponge Rubber Products Co., Derby, Conn.; Virginia Rubatex Corp., Bedford, Va.; and United States Rubber Products, Inc., New York, N. Y. Rubatex Products, Inc., maintains a research and development laboratory in New York.

A later development was a joint discovery by Roberts, Peel, and Scott while operating at Baltimore. This patent[2] with the Denton and other supporting patents covers the process as operated today.



Sponge Rubber Products Co., Derby, Conn.

Autoclave for Impregnating Rubber with Gas



Sponge Rubber Products Co., Derby, Conn.

Process Control Valves and Gages—Storage Tank at Left

Operating Process

While details of the process for manufacturing expanded rubber vary in connection with different products, in general the process may be outlined as follows:

1. The rubber is compounded, mixed, and sheeted or formed in accordance with regular rubber practices.

2. The compounded mass is prepared for the gassing operation either by rolling it between sheets of cloth or metal, or in the case of special shapes by placing it in tubes, or trays, or in molds for forming. In some cases the sheets are put into a rigid metal box so as to confine the rubber during the gas penetration period. Usually in this case metal plates are placed between the sheets to act as separators and to conduct heat.

3. For gas inclusion the rubber is then placed in a gas-tight chamber or autoclave capable of withstanding high pressures. The autoclave is steam jacketed for heating and has the proper gages for indicating internal pressure and temperature. It is piped to permit introduction and removal of gases.

4. After the chamber is sealed, the air is removed with a vacuum pump so as to insure the purity of the gas to be introduced later.

5. Gas pressure varying from 1,500 to 5,000 pounds per square inch is introduced, depending upon the nature of the compound, the desired time of penetration, and the product required. The gassing operation caused many early difficulties. Rubatex engineers were obliged to design a type of closure that would be rapid and still safe and effective. Previous models required 40 minutes to open and close, but present types can be closed by one man in a few minutes.

After the lid was closed the early makers of expanded rubber used a long, slow process to gain the necessary pressures. The usual procedure was to use a water pump and compress the gas in a column, repeating the cycle until the desired pressure was reached. Modern compressors and storage vehicles have corrected this difficulty.

The sealed cells are filled with nitrogen, wherein the soft material differs from a sponge rubber which has been blown with carbon dioxide gas. This gas quickly passes through rubber; whereas nitrogen will remain enclosed indefinitely. It has more recently been discovered that because of its ebonite character, the hard material may be blown with CO_2.

6. Steam pressure is admitted to the jacket for a predetermined period to raise the temperature within the autoclave to the desired points for warming and semi-vulcanization. This heating also increases internal pressure of the gas, and the warming before cure softens the rubber so as to aid gas penetration.

7. After shutting off the steam, the chamber is allowed to cool slowly for a short period; then the cooling is accelerated by the introduction of cooling water into the jacket. This is done to strengthen the cell wall of the partially vulcanized rubber and to reduce gas pressure so as to expedite removal of the gas from the chamber.

8. The gas is then evacuated from the chamber, and air is admitted to atmospheric pressure; next the cover is removed, and the rubber taken out. Most of the expansion occurs after the rolls of rubber have been unwrapped, and it continues for several minutes after removal. The actual amount of expansion depends upon the amount of pressure, plasticity of the rubber, length of gassing time, and the nature of the compound.

9. The rubber is allowed a rest period for recovery as well as to permit full expansion, after which it is shaped and cured in conventional presses or heaters.

[1] U. S. Patent No. 1,905,269.
[2] U. S. Patent No. 2,086,513.

Characteristics of Hard and Soft Types

In the beginning special interest was shown in the hard Rubatex because of its great lightness, rigidity, and exceptional insulating qualities. The hard Rubatex is board-like in appearance and can be cut readily by knife or saw. In test it shows a crushing strength of 80 pounds per square inch. Its weight is three and one-half to eight pounds per cubic foot, or even heavier material can be produced where greater strength is needed.

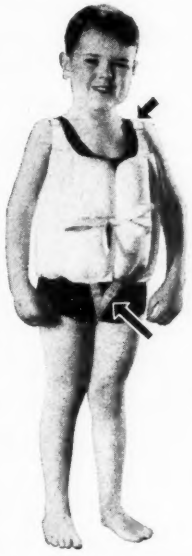
Soft Rubatex resembles a fine-pore light-weight sponge rubber in appearance, but is lighter in weight and has a definite cellular cross-section. It can be made as light as five pounds per cubic foot, but material weighing approximately eight pounds per cubic foot is most commonly used.

A great many compounds have been developed to give especial characteristics to this cell-tight rubber in both the hard and soft varieties for particular applications.

Application of Soft Rubatex

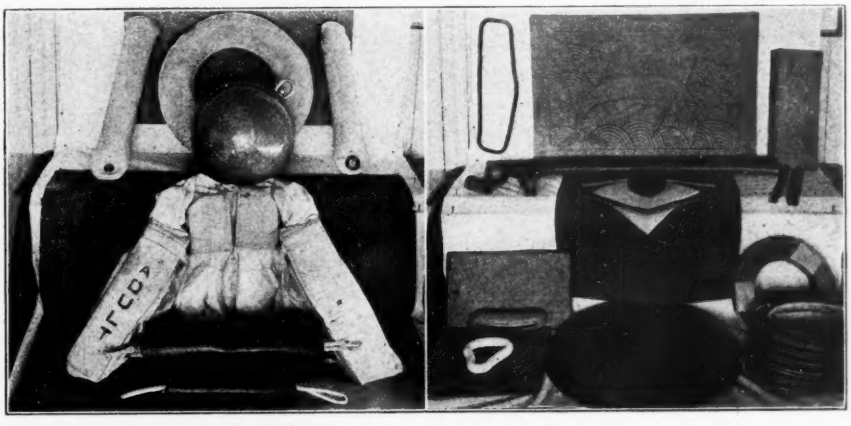
The cold storage field finds soft Rubatex of value for door gaskets and seals, blankets for dry ice, as a lining for shipping containers of various kinds, lids for ice cream containers, peddling boxes, and passing doors or curtains. Rubatex cover tubing is used to prevent condensation on the copper tubing used in refrigerators. In some cases the copper tube has been eliminated entirely, and the brine conducted through the Rubatex tubing.

Athletics such as football, hockey, lacrosse, etc., require maximum protection for the player with minimum weight, and expanded rubber, particularly on wet days in the case of football, is far more satisfactory as padding in the uniforms than the material formerly used. It is being used extensively in high-grade football gear, thus substituting rubber for felt of various kinds. Garden mats, bath mats, kneeling pads, and fire-house landing pads likewise have all been found to be extremely satisfactory.



American Pad & Textile Co., Greenfield, O.

Child's Safety Belt



Sponge Rubber Products Co., Derby, Conn.

Products Made from Soft Rubatex

The fact that Rubatex is soft and pliable, has great buoyancy, and is non-hygroscopic, logically places it in the field for life preservers. The *Morro Castle* and *Mohawk* disasters made the public "safety-at-sea" conscious. The Copeland Committee of the United States Senate, in a report on these two tragedies, recommended expanded rubber as one of the standard materials for life preservers, publishing a pattern especially designed for the use of this type of rubber. The Department of Commerce through the Bureau of Marine Inspection and Navigation also approved gas expanded cell-tight rubber for use in standard life preservers in preference to materials formerly used.

Rubatex engineers are now working with some of the larger manufacturers of life preservers to perfect an improved design which will stow well and act to carry an unconscious person with head out of the water at all times. Safety belts, like the one illustrated, for small children are now being made. They are designed to give a child sufficient buoyancy to enable him to learn to swim without danger.

Rubatex bumpers for boats were one of the first articles placed on the market. They have been widely accepted because of buoyancy, their cushioning effect, and the ability to withstand hard usage. Where the usual types are replaced several times each season, the Rubatex fenders have been reported in a number of cases to last several years.

Application of Hard Rubatex

Hard Rubatex is believed to be the lightest weight material manufactured, and suitable for use in a number of new fields. Its weight is not greater than half that of cork board. Owing to its rigidity, it will stand alone without support; it will not sag, and it will back up thin layers that may be used as an external finishing coating. It is reported to have the same insulating value as double the thickness of materials most commonly used and is shown by the Refrigeration Data Book for 1936 to be superior to any other type of insulation material on the market. Because it does not absorb moisture, this insulating value does not diminish as time goes on.

Hard Rubatex is applicable particularly to three fields: insulation against heat and cold, flotation, and housing. Its usage along these lines has been carried out in England and on the Continent, under the Denton patent, and is now to be instituted in the United States.

As far as flotation is concerned, it is highly adaptable because of its greater buoyancy than other materials and its high resistance to water absorption. Mooring buoys and life rafts have been built and have withstood severe tests. A life raft was subjected to the Navy test by being dropped 60 feet into still water. By the impact the metal corners were caved in, but the raft was unharmed.

Because of its peculiar properties, hard Rubatex fills a need in the construction of inexpensive houses. A complete house wall 1½ inches thick made of hard slabs of this material is reported to provide insulation against heat and cold better than in the case of 18 inches of brick,

(*Continued on page* 48)

Truck Tire Carcass and Low Hysteresis Loss

Maynard F. Torrence[1]

IN THE development of a truck tire carcass stock the degree to which it develops internal heat, when rapidly and frequently distorted (its hysteresis loss), and its ability to withstand that heat without losing its strength or becoming brittle are of primary importance. A suitable stock should not only develop very little heat, but should also retain its physical properties when hot. Long overcures must not adversely affect it. It must resist oxidation and must be compatible with the tread stock.

By the use of combinations of Zenite and Accelerator #8 (formaldehyde-para-toluidine) stocks have been produced which not only have relatively low hysteresis loss when they are deformed, but which also retain exceptionally well their tensile strength and toughness at elevated temperatures. In both these respects such stocks are far superior to those accelerated with straight mercaptobenzothiazole or its salts.

The following data on a typical high-grade truck tire gum carcass stock accelerated with various amounts of Zenite or a Zenite-#8 combination show the value of Zenite-#8 in producing cool running stocks which retain their strengths at elevated temperatures.

The base recipe used in our study was:

Smoked Sheets	100.
Zinc Oxide	10.
Stearic Acid*	2.
Rosin Oil	0.75
Palm Oil	0.75
Neozone D	0.5
Akroflex C	1.
Accelerator	as indicated
Sulphur	2.75

*2% stearic acid was used when the only accelerator was Zenite.

SUMMARY OF PHYSICAL TEST DATA*

Compound:	1251-187		1251-188		1251-88		1251-89	
Cures at 267° F.....	Zenite 0.85%		Zenite 1.05%		Zenite 0.4% #8 1.0%		Zenite 0.6% #8 1.0%	
Tested at 30° C.								
Unaged:								
40 Mins.	3500	710	3875	740	4400	770	4600	740
120 Mins.	3100	750	3450	760	3875	750	3575	720
Aged 2 Days in 100° C. Air Oven:								
40 Mins.	1975	580	1975	520	2525	600	2475	600
120 Mins.	2075	600	2150	600	1150	500	2275	590
Aged 14 days in 70° C. Oxygen Bomb:								
40 Mins.	2575	670	2525	670	2675	670	3000	660
120 Mins.	525	410	725	470	1550	550	1525	550
Tested at 100° C.								
Unaged:								
40 Mins.	720	700	775	660	2400	810	2525	780
120 Mins.	375	470	350	430	2100	750	1475	660
Aged 14 Days in 70°C. Oxygen Bomb:								
40 Mins.	125	390	100	220	1300	750	575	460
120 Mins.	50	100	25	140	100	240	75	200

*Throughout this report tensile strength and modulus at intermediate elongations are expressed in English units (lbs. per sq. in.). Elongation at break is recorded as a percentage of the original length.

[1] E. I. du Pont de Nemours & Co., Inc., Rubber Chemicals Division, Wilmington, Del.

[2] Heat build-up is obtained by placing a vulcanized cylinder of the stock between two parallel plates protected from the metal by ebonite disks. The lower plate is placed on a lever arm so that the sample is kept under a constant load; in this case, 153 lbs. per sq. in. By means of the upper plate the sample is compressed 0.25-in. 1,800 times per min. The test is run until the temperature of the sample remains constant. The temperature is obtained by placing a thermocouple between the ebonite bottom plate and the sample. The temperature is much lower at this point than at the center of the sample.

The following table shows Goodrich Flexometer heat build-up[2] data obtained with various amounts of accelerator in the base formula No. 1251.

Compound	Cure at 267° F. % Accelerator	Heat Build-up 50 Mins.	70 Mins.	120 Mins.
1251-187	0.85 Zenite	24° C.	23° C.	22° C.
-188	1.05 Zenite	23° C.	21° C.	23° C.
-189	0.55 Zenite	30° C.	28° C.	29° C.
-190	1.3 Zenite	21° C.	21° C.	22° C.
-93	0.2 Zenite ..... 1.0 #8	24° C.	19° C.	19° C.
-88	0.4 Zenite ..... 1.0 #8	16° C.	15° C.	18° C.
-89	0.6 Zenite ..... 1.0 #8	13° C.	12° C.	15° C.
-90	0.8 Zenite ..... 1.0 #8	12° C.	15° C.	19° C.
-97	0.3 Zenite ..... 0.75 #8	23° C.	19° C.	20° C.

These data show that the minimum heat build-up in a Zenite stock is obtained with about 1% Zenite, but this produces greater heat build-up than does the poorest Zenite-#8 combination: namely, 0.3% Zenite-0.75% #8. The temperature build-up in a stock containing 50% of zinc oxide is very close to that of a stock containing only 10%, each based on the rubber.

The differences between the stocks shown by tension testing at 100° C. are even more striking than the differences in hysteresis properties. A more complete picture of this phase is shown by the data on the following four zinc oxide stocks:

Compound No. 1251	-191	-192	-102	-103
Smoked Sheets	100.	100.	100.	100.
Zinc Oxide	50.	50.	50.	50.
Stearic Acid	2.	2.	..	..
Rosin Oil	0.75	0.75	0.75	0.75
Palm Oil	0.75	0.75	0.75	0.75
Neozone D	0.5	0.5	0.5	0.5
Akroflex C	1.	1.	1.	1.
Zenite	0.85	1.05	0.4	0.6
Accelerator #8	..	..	1.	1.
Sulphur	2.75	2.75	2.75	2.75

SUMMARY OF PHYSICAL TEST DATA

Compound	Cures at 259° F.	Mod. 600%	Tens. Str.	Elong. at Br.	Mod. 600%	Tens. Str.	Elong. at Br.
		Tested at 30° C.			Tested at 100° C.		
1251-191	30 Mins.	1525	3225	760	400	2250	1000
	45 Mins.	1975	3625	720	575	3000	1000
	70 Mins.	2200	3775	710	725	3325	920
	90 Mins.	2175	3725	720	...	575	560
	150 Mins.	2200	3525	700	...	375	440
1251-192	30 Mins.	1925	3700	740	475	2700	960
	45 Mins.	2225	3750	710	675	3575	960
	70 Mins.	2550	3925	690	...	525	460
	90 Mins.	2425	3925	690	850	850	600
	150 Mins.	2175	3575	690	...	550	500
1251-102	30 Mins.	2000	4075	770	500	3275	1000
	45 Mins.	2575	4200	720	825	3725	920
	70 Mins.	2850	4325	690	1075	3400	860
	90 Mins.	2925	4100	670	1125	3425	860
	150 Mins.	2750	3825	680	1075	3300	860
1251-103	30 Mins.	2450	4350	720	675	3575	920
	45 Mins.	2875	4325	690	1075	3450	860
	70 Mins.	3125	4125	660	1225	2925	800
	90 Mins.	3175	3975	670	1225	1825	700
	150 Mins.	2800	3625	660	1100	2800	800

It has been found that a stock (1251-88) containing Zenite 0.4-#8 1.0 has about the same rate of cure as a stock (1251-187) containing 0.85 Zenite. Likewise, No. 1251-89 and No. 1251-188 are similar in rate of cure. The Zenite-#8 stock does give a much higher modulus and shows an entirely different type of cure than does the

(*Continued on page* 53)

Foreign Trade an Influence for World Peace[1]

E. G. Holt [2]

FOREIGN trade has been with our continent since the days of the Spanish conquerors, when precious metals from Mexico accounted for the greater part of its value. During colonial times our foreign trade consisted largely of tobacco, lumber products, cotton, furs, fish, and foodstuffs such as corn and potatoes. Raw materials made up the bulk of the trade until relatively recent times, but since the turn of the century we have been largely regarded as an exporter of finished manufactures, an importer of raw materials, and (broadly) this is our present position. As a matter of strict fact it is well to remember, however, that less than 50% of our total imports value consists of those economic classes of goods described technically as "crude materials" and "crude foodstuffs," and in years since 1929 "finished manufactures" (aside from "manufactured foodstuffs") accounted but once for over 50% of our exports. Trade since 1929 has been more limited to strict necessities than formerly.

To the matter-of-fact person foreign trade may mean merely the exchange of surplus goods we do not need for other goods which we do need, with resulting improved living standards both for ourselves and those to whom we sell. From a labor viewpoint exports are usually viewed as a factor aiding domestic employment and imports a factor reducing our employment; if we think of import items like rubber, tin, hides, and skins, we at once realize that these imports also furnish employment to domestic labor. Foreign trade, to the exporter and the importer, means rubbing elbows in competition with foreign companies engaged in the same line of business, which is from the viewpoint of domestic consumers a healthy influence tending to keep our domestic concerns operating on a competitive price basis. The fact that our own range of soil and climate does not provide us with everything we need emphasizes the interdependence of nations. But from the government viewpoint, at present, it seems to me that foreign trade is regarded, properly, as the chief influence toward peace in a world disturbed as it has scarcely been in the memory of living men.

Business cannot operate between nations at war, and on the theory that the converse of this statement, that "nations cannot be at war while business is maintained," is also true, the United States is doing everything possible to keep open the channels of world trade. Those business men whose daily occupation is to find ways and means of completing business transactions with customers in foreign countries on a mutually satisfactory basis are far fitter ambassadors of good will than any other kind of representatives. To facilitate business transactions under the guidance of the Department of State our government has already completed 16 reciprocal trade agreements with foreign governments, and under these treaties we have gained easier access to foreign markets for numerous individual types of merchandise in return for similar concessions to other countries. It is perhaps too early to judge fully the economic effect of these treaties, but if they should prove too harmful to domestic industries in particular cases it needs to be remembered that they are subject to denouncement after a certain time in each case; meanwhile their influence as a good will factor has been highly beneficial in every instance. The nations of Latin America have also looked with great appreciation on the change in policy of the United States in abandoning intervention there.

THE rubber industry is vitally interested in foreign commerce and the views, policies, and methods considered by the governmental agencies responsible for the manipulation of contacts and trade agreements which directly or indirectly affect international exchange of materials and merchandise. Common understanding and close cooperation between the beneficiaries of foreign trade and the medium of contact will enhance the ultimate results. Industry has in the Bureau of Foreign and Domestic Commerce an ally whose effectiveness depends largely upon the use and assistance afforded it by the members of industry itself.

There is but one bureau in Washington with the definite duty of foreign trade promotion through service to industry, the Bureau of Foreign and Domestic Commerce. Its work on foreign trade lightens the burdens without lessening the responsibility of citizens engaged in foreign trade. The statistics which it prepares on United States imports and exports are a guide for broad national policy, but for the tradesmen they show where particular commodities can be bought or sold, and the volume of trade, in units of volume (pairs, pounds, number, etc.) commonly used in the particular line of trade. A special division of the bureau maintains lists of foreign importers and dealers by types of merchandise, and lists of foreign producers and exporters, which may be purchased at a nominal price by those interested. Another particular division provides information upon request regarding the rates of import duty assessed on any product imported into any foreign country and information regarding quota restrictions on trade. Formerly the remaining divisions of the bureau were organized only along geographic lines, any inquiry being routed to a Latin American Division, a Far Eastern Division, a European Division, etc., depending on the location of the

[1] Abstracted from a talk presented at Akron, O., on May 18 in connection with the observance of National Foreign Trade Week.

[2] Acting chief, Leather and Rubber Division, Department of Commerce, Washington, D. C.

subject country. We still have such divisions handling regional information, but since 1921 the handling of trade inquiries is organized on a commodity basis, with divisions responsible for information concerning particular commodities in every country of the world. And so we have a Metals and Minerals Division, a Chemical Division, a Foodstuffs Division, a Textile Division, and a Leather and Rubber Division, which interpret trade statistics, maintain files of information, answer correspondence, and publish circulars and reports dealing with the trade in their respective commodities and products. Each division, aside from endeavoring to look out for the public interest as an entity, tries to be of particular assistance in interpreting trade developments throughout the world in so far as they affect the interest of firms trading in the particular commodity field.

I do not need to tell you that foreign trade has undergone far-reaching changes in recent years. Whether a worldwide struggle is going on between forces of liberalism and forces of reaction or not, it is certain that instead of policies designed to enrich human life by commercial intercourse between nations, many nations have initiated programs tending to restrict commercial and other intercourse with their neighbors. The severity of the economic depression is partly responsible for this; the influence of worldwide mechanical industrialization is partly responsible, making more nations competitive with one another in the nature of their products; the rapidity of transport and communication makes developments quickly effective upon business trends, and competition is more noticed when business volume is low; fears of war make nations desire economic self-sufficiency, and this increases the pressure for protection againt imports and for new lines of domestic production, in order to give fuller employment to domestic labor and reduce the burden of relief expenditure. The net effect has for some years been in the direction of nationalistic policies. Extreme nationalism now controls the entire economic life of such nations as Russia, Germany, and Italy; in other cases it has resulted only in their tariff policy becoming more restrictive of trade as in the case of the British Empire; in still other instances it has brought in its wake international control over selected industries as with international rubber, tin, and tea.

Control over an industry by an independent commission is theoretically feasible in many instances. It can often be shown to be theoretically desirable as a means of reducing expenses, assuring adequate supplies, eliminating unfair competition, and so forth. But in practice such controls tend to come under the influence of business men interested financially in their results, and these men have always, so far as I can learn, acted too much from motives of selfishness. Selfishness in a world of economic freedom is bad enough, but in a world of government-controlled economy would probably be much worse, from the point of view of ultimate consumers and the public generally. The effect is to "freeze" the operations of the industry on an artificial plane of operations—in domestic industry, the regulated public utility is permitted by law to earn a certain rate of return, but there is always the question as to how efficiently operated is the company; so in the case of any industry the play of free competition being removed, the spur for progress in cheapening methods of production loses its edge. Over a long period of time these controls will, I think, tend to reduce the importance of merchants as intermediaries between producers and consumers, and this may lead to further regulation. In short, the tendency toward control seems to be cumulative, not because the idea of control is necessarily sound in principle, but sometimes because it offers a vehicle for exploiting one part of the world, or one part of the public, at the expense of another, and sometimes because it seems the most feasible means of a nation protecting its public against the effects of similar controls operated by others. American business men generally seem to me to regard such controls as undesirable, but if they exist, with true business philosophy the attempt is to make money in spite of or even by means of them.

With the trying conditions of international trade at which I have hinted, it is not surprising that export trade requires more knowledge and experience than the small manufacturers can afford, except in highly specialized lines. The tendency has been for international trade in important commodities to fall into the hands of a limited number of leading companies or corporations. Faced with so many bars against international shipment of manufactured goods, large exporters have often established foreign branch factories to service important foreign consuming regions. Perhaps there is no remedy for this. Perhaps it is even economically desirable, tending to bring the standard of living in the foreign country nearer to our level. But nationalistic tendencies in some countries, notably Japan, have taken the direction of considering such branch factories undesirable, and the owners have been forced to sell to Japanese interests, which indicates that the policy is not without dangers.

I think I cannot close this talk better than by quoting words chiseled in the granite over one of the entrances to the Department of Commerce at Washington. These words are as true today as when they were written by Bancroft many years ago. They symbolize, to me, the truth that all present difficulties are of a temporary nature, that business always has taken place and therefore always will continue. The words have to do with commerce, or business in its broadest sense. They are, "Commerce defies every wind, outrides every tempest, invades every zone."

I trust you may agree with me in hoping that American firms in foreign trade may be stimulated to renewed efforts in keeping business active as a bulwark of civilization and peace.

Reclaiming Rubber

The process referred to[1] is characterized by adding to the digestor in the alkali reclaiming process small amounts of oxidizing agents incapable of exerting a halogenating or halo-hydrinating action on the rubber hydrocarbon. The compound employed may be selected from a large group of available materials.

In a typical example 1,000 pounds of properly shredded waste rubber stock are placed in a digestor with 3,000 pounds of water and 150 pounds of caustic soda. To the digestor three to five pounds of ammonium persulphate crystals are added. The digestor is sealed, and the mass heated and agitated for 12 to 16 hours at 370 to 390° F. The reclaimed rubber mass is then discharged from the digestors, washed, and dried. The process provides a reclaim which may be refined in the usual way and is not markedly elastic or resilient.

In a further example in which is present the same amount of rubber, water, and caustic soda two to four pounds of urea peroxide are added to the digestor, and the process is continued as described in the preceding example. Four to eight pounds of pyrophosphate may be added to stabilize and regulate the liberation of oxygen from the urea peroxide. This reclaimed product is characterized by its resilient qualities, but is not tacky.

[1] United States patent No. 2,069,151, Jan. 26, 1937.

Litharge as Accelerator for Chloroprene Plastic Polymer[1]

W. J. Clapson[2]

AS ACCELERATORS in Neoprene Type E compounds loaded with 100 parts of soft carbon black, comparison is made between basic-carbonate white lead, zinc oxide, magnesia, and litharge. Also the author discusses the effect of wood rosin, pine tar, stearic acid, lead oleate, and sulphur on the cure and of some of these on water, gasoline and kerosene absorption with litharge and with magnesia.

THE desirability of using certain metallic oxides to accelerate the vulcanization of the chloroprene plastic polymer known as DuPrene Type F was shown by Bridgwater and Krismann.[3] However the tendency of that polymer to scorch in the presence of zinc oxide or litharge greatly restricted the use of these materials and substantially prohibited the use of zinc oxide alone. This difficulty does not appear to be so pronounced in the case of the polymer now known commercially as Neoprene Type E. The present paper discusses certain properties obtained with the latter material (referred to as polymer) with special reference to litharge as accelerator for it.

Stocks were compounded on a 15 by 30 cm. laboratory rubber mill, with roll temperatures maintained at about 40° C. The mixed stocks were sheeted off at about 0.23 cm. (0.090-inch); the cured slabs were 0.20 cm. (0.080-inch) thick. All cures were made at 148.9° C. (300° F.) in the steam cavities of the press, corresponding to an equilibrium temperature in the stock of about 147.5° C. (297.5° F.). The water absorption tests at 100° and 110° C. were made by immersing the specimens in water and placing them in an autoclave in saturated steam maintained at the temperature indicated. Weight changes were determined by weighing on an analytical balance; volume changes were measured by the Navy method, which consists in determining the water displacement of the sample by weighing it on a Jolly balance. In the case of the gasoline and kerosene absorption tests, the volume increases reported were obtained immediately on removing the sample from the liquid; the stress-strain data were obtained after the sample had been allowed to dry four hours in air. The gasoline used was lead-free motor gasoline of 60° to 62° Bé.[4] All members of a series were prepared by the master batch method, the variable ingredient being added to an appropriate portion of the master batch, and cured simultaneously.

TABLE 1. SYSTEMATIC VARIATION OF LITHARGE

	D2	D3	D4	D5	D6	D7
Polymer	100	100	100	100	100	100
Thermax*	100	100	100	100	100	100
Cottonseed oil	3	3	3	3	3	3
FF wood rosin†	5	5	5	5	5	5
Sulphur	1	1	1	1	1	1
Litharge‡	..	10	20	30	50	100

* Trade name for a soft variety of carbon black.
† FF No. 20 wood rosin (Hercules Powder Co.).
‡ Sublimed litharge was used throughout.

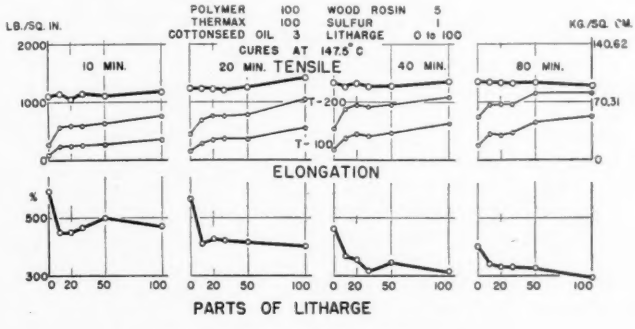


Fig. 1. Effect of Litharge on Cure

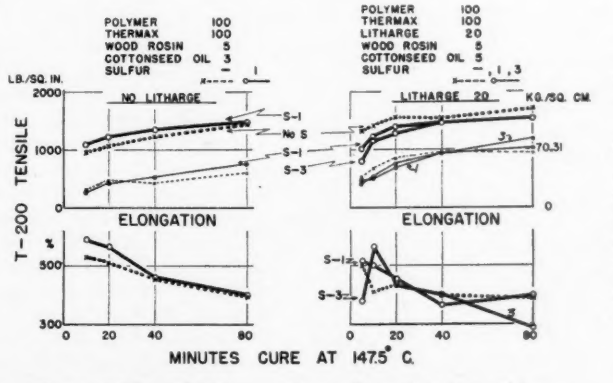


Fig. 2. Effect of Sulphur on Cure, with and without Litharge

Systematic Variation of Litharge

To demonstrate the effect of adding litharge to polymer, the stocks formulated as in Table 1 were mixed. Results are shown in Figure 1.

That the litharge markedly improved the stiffness is evident. It is also evident that increasing the litharge content above ten parts had only a slight additional accelerating effect. Similar results with respect to the effect of litharge were obtained in a series parallel with the above, but containing no sulphur.

Effect of Sulphur

Bridgwater and Krismann

[1] Presented before the Division of Rubber Chemistry at the ninety-third meeting of the American Chemical Society, Chapel Hill, N. C., Apr. 12 to 15, 1937. Reprinted from *Ind. Eng. Chem.*, July, 1937, pp. 789-93.
[2] The Eagle-Picher Lead Co., Joplin, Mo.
[3] *Ind. Eng. Chem.*, 25, 280 (1933).
[4] Sinclair Refining Co.

TABLE 2. RELATIVE WATER ABSORPTIONS AT DIFFERENT TEMPERATURES

Immersion Period	C1, Base*	C2, Base + 2 ZnO	C3, Base + 10 MgO	C4, Base + 2 ZnO + 10 MgO	C5, Base + 20 PbO	C6, base + 20 PbO + 10 MgO	C7, Base + 20 PbO + 2 ZnO	C8, Base + 20 PbO + 10 MgO + 2 ZnO
	% Gain in Weight							
209 days at 27° C.	8.7	10.4	27.3	23.1	4.9	12.3	4.7	12.5
210 hours at 110° C.	50.5	55.3	80.6	61.0	15.6	40.4	15.5	32.8
	Time							
Hours† at 110°, approx. equal to 209 days at 27° C.	22	28	50	65	32	48	32	60
Days‡ at 27°, approx. equal to 1 hour at 110° C.	9.5	7.5	4.2	3.2	6.5	4.4	6.5	3.5

* Same formula as D2, Table I.
† Obtained by interpolation from time-weight data.
‡ Derived from the data in preceding line.

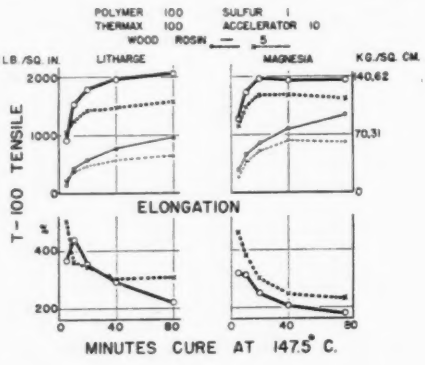


Fig. 3. Effect of Wood Rosin on Cure of Litharge and Magnesia

Extra light calcinated magnesia[7] was used throughout

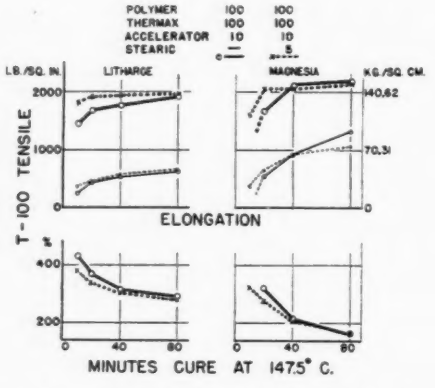


Fig. 5. Effect of Stearic Acid on Cure of Litharge and Magnesia

showed that sulphur affects the rate of cure of Type F polymer; the effect of sulphur on unaccelerated Type E polymer is shown in the left half of Figure 2.

Obviously the addition of one part of sulphur improved the stress-strain properties. Contrasted with the foregoing result is the effect of adding sulphur to a litharge-accelerated base. The formulas and data are shown in the right half of Figure 2. Wood rosin and cottonseed oil were added as ten parts of Prenol A.[5]

Sulphur exerts a slight, though noticeable, retarding effect in this type of litharge-accelerated stock. When selenium, as Vandex,[6] is substituted for sulphur in the formulas of Figure 2, the retarding effect is slightly greater than for sulphur. The effect of sulphur on water absorption is discussed below under water absorption.

[5] National Rosin Oil and Size Co.
[6] R. T. Vanderbilt Co.
[7] General Magnesite & Magnesia Co.

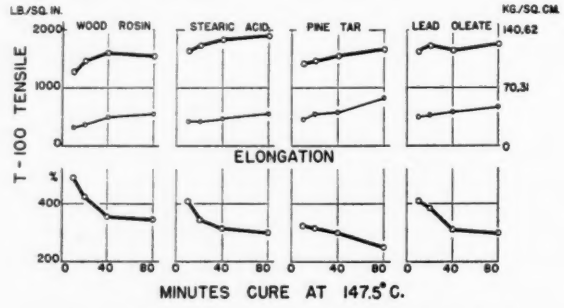


Fig. 4. Effect of Softeners on Cure of Litharge Stock

Polymer	100	Litharge	20
Thermax	100	Cottonseed oil	3
Sulphur	1	Softener	5

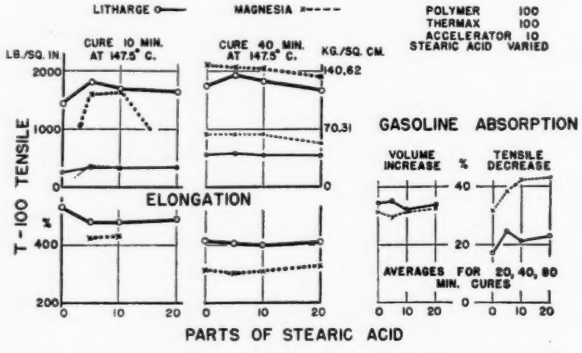


Fig. 6. Systematic Variation of Stearic Acid with Litharge and Magnesia

Softeners

WOOD ROSIN. In the preceding formulas, FF wood rosin has consistently appeared as one of the ingredients. Bridgwater and Krismann show that in the Type F polymer which they were using wood rosin or similar softener was necessary for the development of optimum properties. However in the present type of polymer and of formulation there is a general tendency for it to reduce moduli of elasticity and tensile strengths, as shown in the data of Figure 3. Nevertheless practical processing is claimed to be benefited by the presence of some wood rosin.

COMPARISON WITH OTHER SOFTENERS. In view of these stress-strain results, it is of interest to compare wood rosin with some other common softeners. Data comparing wood rosin, stearic acid, pine tar, and lead oleate in a litharge-accelerated base appear in Figure 4.

Both stearic acid and lead oleate gave stocks which were easily handled on the mill; on the other hand, the pine tar and wood rosin stocks tended to stick to the rolls.

Stearic acid gave stiffer vulcanizates with higher tensile strengths than did wood rosin; lead oleate behaved simi-

TABLE 3. EFFECT OF SULPHUR ON WATER ABSORPTION OF NON-ACCELERATED STOCK

	D1	D2
Polymer	100	100
Thermax	100	100
FF No. 20 wood rosin	5	5
Cottonseed oil	3	3
Sulphur	...	1
Cured 60 min. at 147.5° C.		
% Gain in Weight after Immersion in Water		
28 days at 27° C.	2.8	3.1
12 hours at 100° C.	4.8	5.5
12 hours at 110° C.	6.6	7.8

TABLE 4. EFFECT OF SULPHUR ON WATER ABSORPTION OF LITHARGE-ACCELERATED STOCK

	D12	D14
Polymer	100	100
Thermax	100	100
FF wood rosin	10	10
Cottonseed oil	3	3
Litharge	20	20
Sulphur	...	1
Cure at 147.5° C., Min.	% Gain in Weight after Immersion for 24 Hours in Water at 110° C.	
40	6.3	5.6
80	6.7	6.2

TABLE 5. EFFECT OF SOFTENERS ON WATER ABSORPTION*

Compound	Softeners	Increase after Immersion in Water at 110° C. for 24 Hours* % by Vol.
J1	Wood rosin	10.4
J2	Stearic acid	9.9
J3	Pine tar	7.8
J4	Lead oleate	9.2

* Average of 20- and 40-minute cures at 147.5° C.

larly to stearic acid, but tensile strengths were a little lower; pine tar gave stiffer, shorter stocks than wood rosin, but lower moduli and tensile strengths than the stearic acid stocks.

The excellence of these results with stearic acid prompted a further study. Bridgwater and Krismann stated that stearic and other fatty acids have little or no stiffening and activating effect on chloroprene polymers (presumably in the presence of magnesia or magnesia plus zinc oxide as accelerators). However it appears that in Type E polymer stearic acid has appreciable effect, as shown by the data in Figure 5.

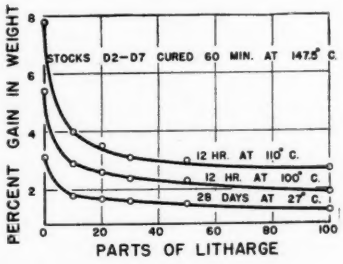


Fig. 7. Effect of Litharge on Water Absorption

It is evident that five parts of stearic acid improved the cure and modulus appreciably; however, as shown in Figure 6, ten parts or more gave no additional improvement. With ten to twenty parts, moduli and tensile strengths are lowered, doubtless because of excess softener. The retarding effect of twenty parts stearic acid on the magnesia stock is noteworthy. Stearic acid did not improve resistance to gasoline. Other data at hand show similar results as regards resistance to kerosene. (The dotted lines leading to some indefinite point near the axis indicate a porous cure; e.g., the magnesia stock with no stearic acid did not cure at ten minutes.)

Water Absorption

Polymer, like rubber, absorbs water slowly over long periods. Specimens containing zinc oxide, litharge, and magnesia, singly and in combination, were still gaining in weight after 209-day immersion in water at about 27° C. A duplicate set was also still gaining after 210-hour immersion in water at 110° C. Absorption is enormously faster at 100° than at 27°, and still faster at 110° C. However the relative rate for the three temperatures apparently changes with formulation; therefore the relative rating of a given pair of stocks depends on the temperature of the test. This point is illustrated by the data in Table 2. At 27° C. stocks C6 and C8 had higher water absorption than the base, but at 110° they had lower water absorption than the base. Table 2 also demonstrates the low water absorption conferred by litharge, the high water absorption conferred by magnesia, and the effect of various combinations. The effect of zinc oxide in increasing the water

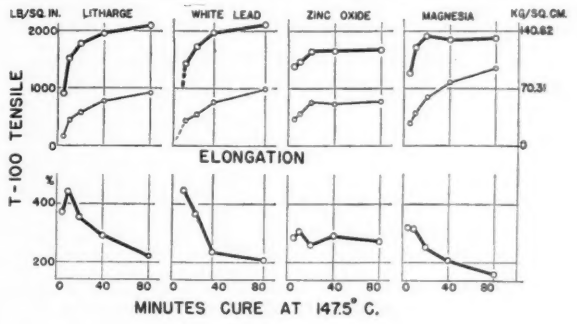


Fig. 8. Comparison of Cure of Four Accelerators without Acid Softener

Polymer	100	Sulphur	1
Thermax	100	Accelerator	10

absorption of the base as contrasted with its effect in decreasing water absorption in combination with magnesia or litharge is interesting.

In another experiment specimens of stocks C1 to C8 (Table 2) and D2 to D7 (Table 1) were soaked in water at 27° C. for a month and then allowed to dry in air under room conditions. After drying for two months, the specimens had reached substantially constant weight which was lower than the original weight in the case of the stocks containing no magnesia (indicating leaching) and higher than the original weight in the case of magnesia-containing stocks. Further loss in weight of the latter stocks occurred slowly under reduced pressure (6 mm. or less) at 70° C., under which conditions magnesium hydroxide decomposes. The evidence, while not unimpeachable, indicates the possible formation of magnesium hydroxide when magnesia stocks are subjected to water. However the total amount of water absorbed is much in excess of that which can be accounted for by the conversion of magnesia to magnesium hydroxide.

There are indications that water absorption of the non-accelerated polymer is increased by sulphur (Table 3) and that, on the other hand, water absorption of a litharge-accelerated base is decreased slightly by sulphur (Table 4).

Litharge, as just shown, confers low water resistance on polymer. Water absorption data on the compounds of Table 1, cured 60 minutes at 147.5° C., are shown in Figure 7. Water absorption decreased sharply with ten to twenty parts of litharge and less sharply, though continuously, with litharge up to 100 parts.

The effect of the softeners in stocks J1 to J4 is shown in Table 5. It is evident that the variation in softener affected water absorption but little; the slight effect was in favor of pine tar.

Comparison of Accelerators

Of the lead-containing accelerators tested—litharge, basic-carbonate white lead, sublimed white lead, and sublimed blue lead—litharge and basic-carbonate white lead (B. C. W. L.) show most promise. A comparison of litharge, B. C. W. L., zinc oxide, and magnesia in a

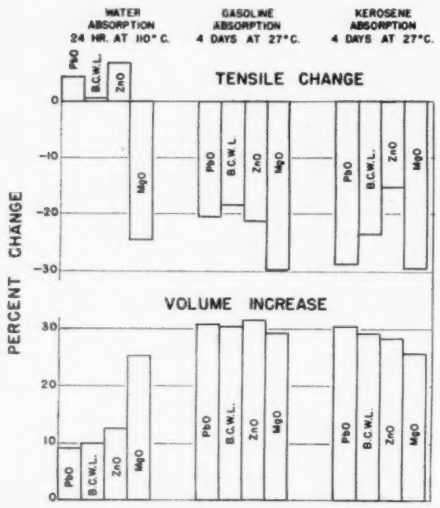


Fig. 9. Water, Gasoline, and Kerosene Absorption of Four Accelerators without Acid Softener

Data are averages of 20- and 40-minute cures

Polymer	100	Sulphur	1
Thermax	100	Accelerator	10

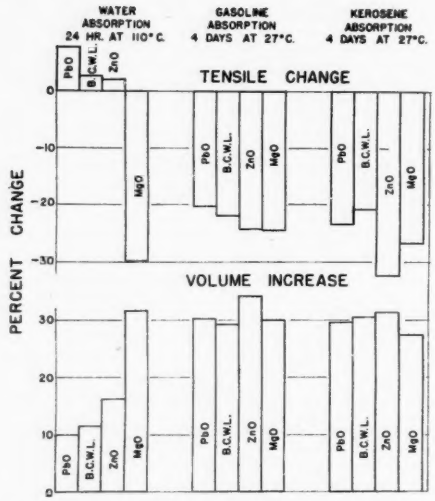


Fig. 11. Water, Gasoline, and Kerosene Absorption of Four Accelerators with Wood Rosin

Data are averages of 20- and 40-minute cures

Polymer	100	Accelerator	10
Thermax	100	Wood rosin	5
Sulphur	1		

loaded stock containing sulphur, but no softener or acidic activator is shown in Figure 8.

Analogous to its action in rubber, B. C. W. L. is slower in rate of set-up than litharge, but otherwise they give stocks of similar rate of cure and stress-strain properties. Zinc oxide gave fast set-up and moderate stress-strain properties. Magnesia gave faster set-up than litharge, but not so fast as zinc oxide, and short stiff stocks.

All of the foregoing stocks were difficult to sheet out smoothly in the uncured state, especially the magnesia stock, because of lack of plasticizer as shown by their ready conversion to smooth stocks on addition of wood rosin.

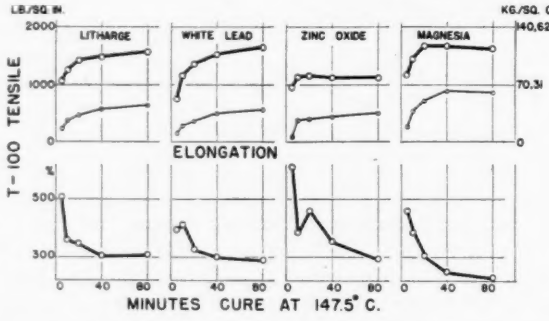


Fig. 10. Comparison of Cure of Four Accelerators with Wood Rosin

Polymer	100	Wood rosin	5
Thermax	100	Accelerator	10
Sulphur	1		

Their relative resistance to water, gasoline, and kerosene are shown in Figure 9. Of the four, litharge gave lowest, and magnesia highest water absorption. Differences in resistance to gasoline and to kerosene are not indisputably established.

When five parts of wood rosin are added to the compounds of Figures 8 and 9, the resulting stocks compare as to curing properties as in Figure 10.

As in the preceding series, B. C. W. L. was slower in set-up, and magesia faster in set-up than litharge. Zinc oxide was about equal to litharge in set-up, but gave lower tensile strengths and generally lower moduli.

The relative resistances of these stocks to water, gasoline, and kerosene are shown in Figure 11. Litharge and B.C.W.L. behaved similarly; both gave lower water absorption than zinc oxide and than magnesia, especially the latter. Smaller differences are shown as regards resistance to gasoline and to kerosene.

If stearic acid is substituted for the wood rosin in the stocks of Figures 10 and 11, the relative curing results for the four accelerators remain substantially as described.

Summary

The chloroprene plastic polymer known commercially as Neoprene Type E is discussed with special reference to litharge as an accelerator of vulcanization. All data pertain to stocks loaded with 100 parts of soft carbon black.

Substantially maximum stress-strain properties and rate of vulcanization are obtained with ten to twenty parts of litharge, although water absorption decreases with the litharge content (at least up to 100 parts of the latter). Rate of cure, stress-strain properties, and water absorption appear to be increased by sulphur in the absence of accelerator, but decreased by sulphur in the presence of litharge. Litharge sets up faster than magnesia in the absence of 1% of sulphur, but slower than magnesia in the presence of 1% of sulphur.

Stearic acid activates both litharge and magnesia, but the former is the less sensitive to the quantity of stearic acid. Wood rosin may have a mild activating effect on litharge and on white lead, but tends to reduce moduli and tensile strengths. Pine tar gives short stiff stocks; lead oleate behaves similarly to stearic acid. Stearic acid does not improve gasoline and kerosene absorption.

Basic-carbonate white lead is slower in set-up, but otherwise behaves similarly to litharge. Zinc oxide gives fast set-up and moderate physical properties; it is retarded by wood rosin.

Litharge confers low water absorption, magnesia gives high water absorption. Water absorption increases with the temperature, the rate of increase being dependent on the formulation. Water absorption is not appreciably influenced by the softeners used.

The Imminent Wage-and-Hour Bill

Arnold Kruckman

THIS brief analysis endeavors to interpret from a neutral viewpoint the apparent governmental objectives, the attitude of interested groups, the expectancy of constitutionality, the far-reaching latitude of anticipated provisions, and the general conditions attending the preparations by the Administration for legislation, the enactment of which is to be attempted at the special session of Congress. At the time this article is written, the final form of the bill is not publicly known, and hence this discussion can only reflect the circumstances then evident.

THE wage-and-hour bill will be one of the main causes of contention in the special session of the Congress. The title of this proposed legislation is too narrow in its implications. The so-called wage-and-hour bill will include a much wider field than merely the hours and the wages of workers. It is broader even than an effort to regulate the relations of the worker with the employer. The original bill, which bore the names of former Senator Black and the late Representative Connery, was definitely designed to create a constitutional substitute for the NRA. The bill which will now be offered will go further than the legislation that aroused enough opposition to cause the southern members to hold it in the Rules Committee. In addition to the major features of the original bill, known as the Black-Connery bill and now frozen in the Rules Committee, it is proposed that the bill to be offered will include general regulation of trade and its practices.

Attitude of Affected Groups

The South remains stubbornly opposed to any legislation that does not insure industry and business below the Mason and Dixon line authority to apply differentials, which the southern employer deems essential, on account of the climate which slows up the worker, the difference in the type and race of the workers, and the difference in the standard of living and the cost of living. The American Federation of Labor is opposed to the proposed law because it feels that it discriminates against the craft worker and favors the C. I. O. Moreover it holds that the proposed Fair Labor Standards Board is endowed with too much power and that the whole tendency of the law would be to wipe out labor unions and create a labor monopoly regulated by the Government. Curiously enough, the C. I. O. is in full agreement with the A. F. of L. about the overpowering authority of the proposed Board and the monopolization of the regulation of labor by Government.

However wide apart they may be in their opinions about other features of the bill, it is striking that organized labor, and the leaders of industry and business, are in agreement concerning the excessive powers that would be bestowed upon the proposed Board. It is felt that these proposed powers are so wide and so elastic that the Board might make the law fit almost any circumstance that comes within its purview; and that its authority is so unfettered that it might impose its discipline without the usual recourse to the Courts. For instance, it is the general understanding that the wage schedule would set the minimum at 40¢ per hour and the work schedule at 40 hours per week. The lawyers of the Department of Justice themselves interpret the bill, introduced at the last session, as meaning that this "floor" and this "ceiling" are merely guides, and that the figure is approximate, the proposed law giving the Board the authority to revise it downward, if necessary, to avoid unreasonably curtailing the workers' opportunity for employment. And, naturally, the figure may be revised upward if the Board finds it possible without unreasonably curtailing the opportunities for employment.

"But," say these students from the Government's standpoint, "not above what may fairly be regarded as a minimum standard of living necessary for health and efficiency—i. e., substantially the same standard as was approved in the Washington minimum wage case."

It may be remembered that in the Washington minimum wage case, decided March 29, 1937, the Supreme Court held that the cost of living was a sufficient standard for the purposes of the Fourteenth Amendment, which amendment provides that no person shall be deprived of life, liberty, or property without due process of law.

Seasonal Occupations

As part of the discussion of the wage schedule it is interesting to note that the Board apparently would not be able to fix a minimum fair wage in excess of $1,200 per year. However there is another provision that in circumstances and occupations which do not give the worker full employment the Board might fix a still higher rate, a rate of 80¢ per hour; and the 40-hour minimum, under such circumstances, might be ignored in order to give the worker every opportunity to earn as much money as the circumstances or the season will permit.

As the Department of Justice students understand the bill favored by the Administration, the purpose is to empower the Board to enable workers to step up their earning power, with due regard to health, efficiency, and well-being. Apparently the object is to permit the seasonal worker, and the worker whose occupation is governed by special conditions, to earn as much in his working season as he might earn during a year, under the standard-of-living yardstick that may be set up by the Board. The health, efficiency, and security of the worker and his family are objectives of the legislation.

Constitutional Expectancy

"It is important to remember that the Supreme Court very rarely finds fault with a Congressional delegation of power," declares an official of the Department of Justice. "There is, it should be remembered, no case where Con-

gressional delegation of power has been adjudged invalid where the delegation has been made to a permanent governmental, administrative commission, independent of the executive branch of the Government. . . . Indeed Congressional delegations of power to official administrative agencies have been held invalid in only two cases: the Panama Refining Co. case and the Schechter case. In the first, delegation was held to be improper because the range of administrative discretion was not only unlimited, but wholly undefined. In the Schechter case the Court . . . could find no adequate definition of the subject to which the codes were addressed. The Chief Justice stated: 'Congress cannot delegate legislative power to the President to exercise an unfettered discretion to make whatever laws he thinks may be needed or advisable for the rehabilitation and expansion of trade and industry.'

"There is nothing in the adjudicated cases which suggests that the constitutional rule against the delegation of essential legislative powers is violated by a bill, like the proposed (Fair Labor Standards) bill, which dealing with many and diverse industries not only defines the subject-matter to which an administrative agency may address its discretionary powers, but clearly states the purposes for which the administrative discretion may be used. Unlike the statute in the Panama Refining Co. case, the bill does not omit to state the range of the administrative discretion vested in the Board, but clearly states the purposes for which it may be exercised. Unlike the statute in the Schechter case, the proposed bill carefully defines the subject matter to which the administrative agency may address itself.

"The proposed bill deals with difficult and complex industrial situations. A careful and deliberate procedure has been provided; orders of the board may be entered only after hearing. The draftsmen have been careful and painstaking to make the standards as definite and specific as the conditions with which they have had to deal permit, without imposing upon the diversities of American industry inflexible and unworkable rules provocative of serious industrial dislocations. The standards are well within constitutional limitations, assuming, of course, that constitutional limitations are to be construed to make a constitutional democracy workable and not to render it impotent."

Scope of the Bill

The bill discussed is the bill for which the Administration will fight. It is obvious the bill is considered proof against the attack that killed the NRA. There are provisions in this bill empowering the proposed Board to label fair goods and to label unfair goods. Overtime work will be permitted only by express permission of the Board. Minors, female under 18 and males under 16, may work only by permission of the Board. Aged and crippled will be permitted to work only by special permission. Employers must keep a full life history of all employes under 21. Employes are required to leave the premises promptly after doing their legal stint. Goods found unfair by the Board may be denied all interstate transportation. Goods sold only in intrastate commerce, but of whose quantity or volume only 1% is in competition with interstate commerce, will be held amenable to Fair Labor Standards. Labor, in effect, would have a voice in management, somewhat like the C. I. O. shop committee that confers with the managers of automobile plants daily.

It is expected new amendments will make fair trade practices part of the fair labor standards. Unfair labor standards may outlaw products as contrary to fair trade. It is probable that competition may be controlled, prices "supervised," and advertising, either printed or spoken, policed.

It has been suggested that Senator O'Mahoney's licensing bill should be amalgamated with this labor-trades practices bill. This would set up corporations, in effect combinations, or monopolies, within which all similar businesses would function separately, in a national corporation under Government supervision. The principle would be similar to the principle that governs the Bituminous Coal Commission, which fixes prices, volume, wages, etc. The general idea is being worked out in the Agricultural Adjustment Administration and the Farm Security Administration, which constitute a monopolistic controlling mechanism for all agricultural industry of the United States.

Rubatex

(*Continued from page 39*)

lath, and plaster. Cooling or warming of the walls, which is a large item with thick uninsulated walls, becomes a negligible factor. With the outside temperature at zero it has been estimated that 100 times as much heat would be required to bring the inside of a brick wall to 70° Fahrenheit than in the case of a Rubatex wall of 1½-inch thickness.

Expanding Synthetics

Both Neoprene and "Thiokol" have been expanded by this process. The resulting product resists oils with the usual effectiveness of synthetic rubber in other products. No success has been experienced to date in the making of a hard board by this method. Steps are being taken to put on the market sheets of light, medium, and heavy densities. Other substances, such as Bakelite, have also been expanded to produce a light weight article. However this phase has not been pursued beyond an experimental stage.

Corporate Policies

Rubatex Products, Inc., with general offices at 277 Park Ave., New York, owns and controls all patents including the Denton process. This company does not intend to manufacture, but rather to act as a licensing unit devoting its time and effort to assisting licensees and the carrying on of research for the benefit of all. Arrangements have been made for an interchange of information with the Expanded Rubber Co. of England as well as the mutual use of patents. Dr. Dudley Roberts is president, and W. M. Flook, chairman of the board of directors.

Acknowledgment

Information and photographs used in this article were obtained through the cooperation of S. E. Kienitz, of Sponge Rubber Products Co., and Dr. Dudley Roberts, of Rubatex Products, Inc.

The Absorption and Diffusion of Water in Rubber[1]

H. A. Daynes

IN ADDITION to its application to absorption problems, the subject matter in this article has a relation to the drying of crude rubber and latex deposits.

A theory of water absorption is advanced based on a modified diffusion equation. Deviation from the simple laws of diffusion is shown to depend upon the variation of osmotic pressure within the rubber as influenced by the presence of water soluble materials. Practical application will depend largely upon the solution of the differential equation involved.

MOST of the published work on the absorption of water by rubber is concerned with the amount absorbed under conditions of equilibrium with atmospheres of known humidity, or with solutions of known vapor pressure, and comparatively little with time relations before equilibrium is established or during fluctuating conditions. That this non-equilibrium period is often important may be shown by the following typical cases of practical interest.

(*a*) One of the costly major operations on the plantation is the drying of rubber. This process is limited by the rate of diffusion of moisture through the rubber, and any acceleration of the process would be of great economic importance to the industry.

(*b*) It is frequently necessary to investigate the amount of water which rubber will absorb under equilibrium conditions. As the time taken to reach equilibrium under ordinary test conditions may be many months, it is important to decide to what extent the final absorption can be predicted from short period tests.

(*c*) In electric cables the various electrical properties which affect the transmission properties are differently affected by the spatial distribution of the absorbed moisture through the dielectric. Similar problems occur with solid insulators in which the surface resistivity and other electrical properties are differently affected by periodic changes of ambient humidity.

The study of these aspects of the subject requires the establishment of a satisfactory differential equation of diffusion of moisture through the rubber, and it has previously been assumed that a simple equation which applies to the diffusion of gases applies equally well to the case of water. It is the purpose of this paper to show that the simple equation does not apply to substitute a modified equation which agrees more nearly with observations, and to draw attention to important consequences of this departure from the simpler diffusion laws.

Theory of Time-Absorption Curve

Simple Gases in Rubber

To make clear the special behavior of water, it is recalled that simple gases obey Fick's and Henry's laws, the appropriate differential equation for the case where concentration varies in one dimension only being

$$\frac{\partial c}{\partial t} = D\frac{\partial^2 c}{\partial x^2} \qquad (1)$$

where c is the concentration at time t in a plane at a distance x from the origin measured in the direction of diffusion, and D is the diffusion constant. This is analogous to the case of conduction of heat.

The case of most frequent interest for experimental purposes is that of a sheet of thickness $2a$, and of such thickness that edge effects may be neglected, initially free from the gas, but suddenly immersed at time $t = 0$ into gas maintained at a fixed partial pressure.

In diffusion experiments it is usual to measure the total quantity absorbed, and solutions for this case are given by Andrews and Johnston,[2] and McKay.[3] Their principal conclusion for our purpose may be expressed thus:

If Q and Q_∞ are the quantities of gas absorbed at times t and ∞ respectively, the degree of saturation as shown by Q/Q_∞ may be expressed as a series in terms of a single parameter $\tau = \frac{4a^2}{\pi^2 D}$ which may be called the Time Constant.

Diffusion of Water Vapor in Rubber

In previous literature on the subject[4] it has been assumed that diffusion of water through rubber can be expressed by the differential equation (1) applicable to gases; but in view of the complex nature of the absorption of water by rubber[5] it is desirable to examine this assumption more critically.

Since the absorption is largely due to the formation of a solution of water-soluble substances within the rubber, it is to be expected that the rate of diffusion at any point will be proportional to the gradient of osmotic pressure instead of the gradient of concentration of water. In other words, the symbol c now represents quite different properties on the two sides of the equation (1). On the left it represents the concentration of water in the rubber; while on the right it is a function of the concentration of water-soluble substances in the absorbed water. Now the difference between the osmotic pressures of two aqueous solutions is proportional to the difference

[1] Abstracted from *India Rubber J.*, July 10, 1937, pp. 9-15, which was reprinted from the *Trans. Faraday Soc.*, 192, XXXIII., Part 4, Apr., 1937.
[2] *J. Amer. Chem. Soc.*, 46, 640 (1924).
[3] *Proc. Physic. Soc.*, 42, 547 (1930).
[4] *E.g.*, Andrews and Johnston,[2] N. H. van Harken, *Kautschuk*, 7, 108 (1931).
[5] Lowry and Kohman, *J. Physic. Chem.*, 31, 23 (1927).

between the relative humidities (R.H.) of the atmospheres which would be in equilibrium with the solutions. Equation (1) must, therefore, be rewritten:

$$\frac{\partial c}{\partial t} = D^1 \frac{\partial^2 h}{\partial x^2} \qquad (2)$$

where h=relative humidity of the atmosphere, which would be in equilibrium with the internal solution at x (to be called the "equivalent humidity"),

and D^1=a constant depending on the rubber. (The possibility of its varying with the amount of water absorbed must be borne in mind.)

Moreover the relation between c and h can be determined experimentally by measuring the equilibrium absorption of water by rubber in solutions or in atmospheres of known relative humidity,[6] and is of the type shown in Figure 1, the shape of the curve depending on the rubber. The vulcanized sample shown was made from commercial smoked sheet and contained 5% combined sulphur.[5]

It should be noted that c in Figure 1 is the weight of water per unit weight of dry rubber; whereas in equation (2) it is the volume of water per unit volume of rubber plus absorbed water. As the amount of water is usually small, this difference may be left out of account for the present in considering the shape of the relative humidity/absorption curve.

Equation (2) may now be written.

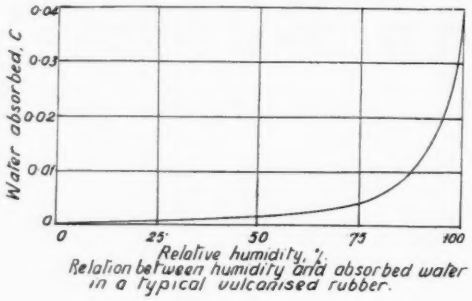
$$\frac{\partial h}{\partial t} \cdot \frac{\partial c}{\partial h} = D^1 \frac{\partial^2 h}{\partial x^2}. \qquad (3)$$

This is the equation which is proposed to replace the commonly accepted equation (1). The consequences of the revised theory and the evidence of its validity is considered below.

Study of Time/Water-Content Curve in Light of Revised Theory

Since $\partial c/\partial h$ is not constant (see Figure 1), the solutions of equation (1) cannot now be used either to determine c or h as a function of x and t, or to obtain the total absorption at a time t by integrating c with respect to x. However, pending a solution to equation (3), some useful conclusions may be drawn which may be made the basis of experimental tests of the theory. It is proposed to consider several aspects of the problem, (a) to indicate in what way water diffusion is expected to differ from gas diffusion, (*b*) to cite published work bearing on these predictions, and (*c*) where published information is lacking, to describe new experiments.

In this connection, it is pointed out that the theory applies only to conditions in which equilibrium can be reached. Consequently it is necessary to leave out of consideration most of the published work on the drying of raw rubber, where the initial and final states are usually indefinite, on the drying of freshly coagulated rubber, which appears to be a very complicated system, and on the absorption of water by unvulcanized rubber at very high humidities, where equilibrium is seldom reached.



Relation between humidity and absorbed water in a typical vulcanised rubber.

Fig. 1

Time-Absorption Curve with Narrow Range of Humidity

If a sheet saturated at relative humidity h_1 is transferred to another humidity h_2, so close to h_1 that $\partial c/\partial h$ may be considered constant from h_1 *to* h_2, the time-absorption relation is similar in form to the solution of equation (1) writing

$$D^1 \left[\frac{\partial c}{\partial h}\right. \text{for } D \text{ and } \frac{Q - Q_i}{Q_m - Q_i} \text{ for } Q/Q_m,$$

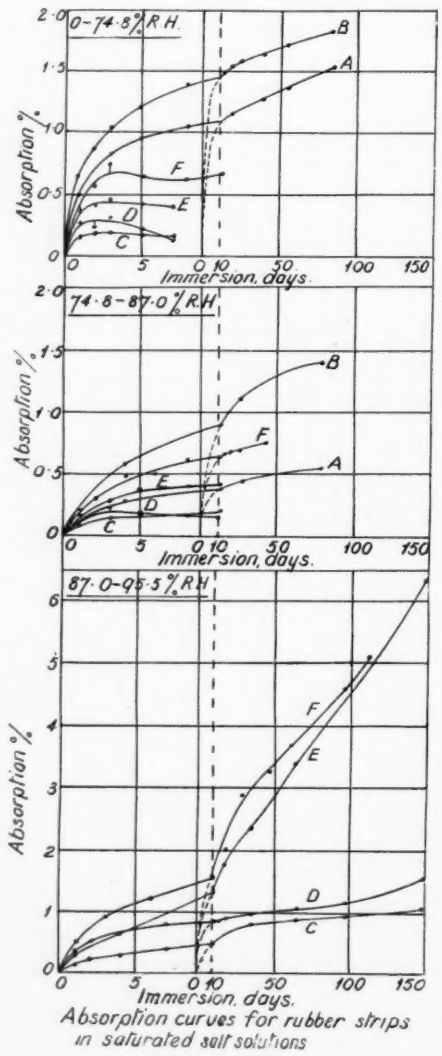
where Q_i=quantity of water uniformly absorbed initially. The expression

$$\frac{4a^2 \dfrac{\partial c}{\partial h}}{\pi^2 D^1}$$ now takes the place of $\frac{4a^2}{\pi^2 D}$

as the time constant of the curve. Since $\partial c/\partial h$ increases with humidity and also, usually, with the hydroscopicity of the rubber, the time taken to reach a given value of $\frac{Q - Q_i}{Q_m - Q_i}$ will increase with these factors also; whereas if the simple gas diffusion equation (1) applied, the time constant would be independent of them.

The rubber compounds used in the experimental work are shown in Table 1. All the samples were vulcanized normally (*i.e.*, nearly to maximum tensile strength), except those containing a high percentage of sulphur, in which cases samples which did not exhibit "blooming" were chosen to avoid complications due to loss of free sulphur. To minimize the thickness in one dimension, most of the specimens used were parts of the outer rings from which Schopper tensile test rings had been punched.

After preliminary drying *in vacuo* for four days at 70° C., the specimens were immersed in an appropriate saturated salt solution in



Absorption curves for rubber strips in saturated salt solutions

Figs. 2, 3, and 4

[6] Lowry and Kohman,[5] Daynes, *India Rubber J.*, 84, 376, (1932).

stoppered bottles and maintained at 34° C. At intervals the specimens were withdrawn superficially dried, weighed, and reimmersed. The salts used and their equivalent humidities at 34° C. were as follows[7]: sodium chloride, 78.4% R.H.; sodium sulphate, 87.0% R.H.; potassium sulphate, 96.5% R.H. After the preliminary drying each specimen was placed in the sodium chloride solution and weighed at intervals until equilibrium was reached, then transferred to the next solution in order of humidity, and so on. In some cases the whole series was not completed since equilibrium was not reached in a reasonable time.

The absorption, in excess of the final absorption at the previous humidity, expressed as a percentage of the dry weight is shown in Figures 2, 3, and 4. The immersion of A and B had to be longer than that of the other specimens, and, as it was thought that the failure to reach equilibrium might be due to oxidation, the specimens were transferred to the second solution without waiting for equilibrium; they were not immersed in the third solution. Specimen D behaved in a peculiar way, the absorption in the solutions of lower humidity rising to a maximum and then decreasing, as if soluble material were being extracted. Specimens E and F, expected to have bad aging properties, did not reach equilibrium at the highest humidity.

In spite of the errors inherent in these small measurements, it is evident that, with any of the rubbers tested, the half-saturation period increases rapidly with the mean humidity over which the absorption takes place, as predicted by the osmotic theory. Further, there is a rough, but quite distinct parallelism between the hygroscopicity of the rubber and the half-saturation period. (In this comparison sample D must be excluded, since it differed in dimensions from the others.)

TABLE 1

	Rubber Sample					
	A	B	C	D	E	F
Smoked sheet rubber	100	100	100	100	100	..
Para rubber	..	..	..	..	..	100
Zinc oxide	62	62	50	65.5	..	..
Gas black	30	30	1.5	..	..	..
Sulphur	6	7.2	3	2.5	5.3	5.3
Triphenylguanidine	2	2.4	..	..	..	..
Mercaptobenzthiazole	..	..	0.7	..	..	..
Tetraethylthiuramdisulphide	..	..	..	0.5	..	..
Alkali tire reclaim	..	40	..	..	..	..
Paraffin wax	..	..	3.5	..	..	..
French chalk	..	..	40	..	..	..

Time-Absorption Curve over Wide Range of Humidity

Although the time-absorption curve for a rubber changing from equilibrium at one humidity to equilibrium at a much higher humidity cannot be calculated without the complete solution of equation (3), the following considerations will throw some light on the general shape of the curve. The concentration of water, and therefore the value of $\partial c/\partial h$, at each point in the rubber increases continuously with time. For each increment in "equivalent humidity" both the capacity of the rubber to absorb water, and the "time constant" of the time/equivalent humidity curve increase rapidly. These effects may be represented in a general way as a modification of the "normal gas absorption curve" by continuously expanding absorption and time scales.

Andrews and Johnston[2] have shown that when sheets of a given rubber of various thicknesses are immersed in water, and the amount of water absorbed, expressed as a fraction of the saturation value, is plotted against time/(thickness),[3] all the points lie on a single curve; but this curve differs in shape from that predicted from equation (1), the initial rate of rise being relatively too great. The difference in shape was attributed by the authors to variation in structure through the sheets due to calendering, but it now appears that equation (3) is sufficient to explain both the variation of rate of absorption with thickness and the then unexpected shape of the time/absorption curve.

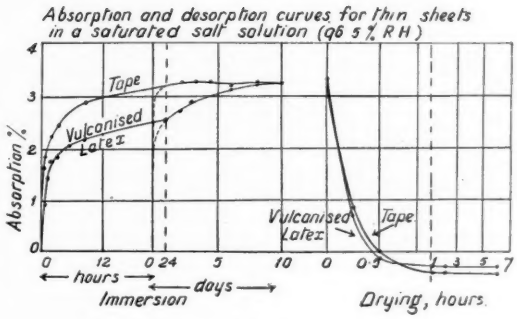


Fig. 5

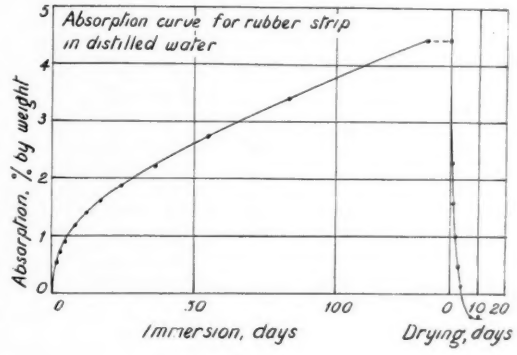


Fig. 6

The shape of the time-absorption curve over a wide range of humidity is shown by the following experiments.

In order to obtain equilibrium in a short time, and so reduce the risk of oxidation effects, very thin sheets, both of substantially unloaded vulcanized rubber, were used, and a final humidity of 96.5% R.H. was adopted instead of 100%. The available materials were (*a*) golf ball tape about 0.16 mm. thick, and (*b*) sheet made from vulcanized latex about 0.13 mm. thick.

After preliminary drying, the specimens were immersed in saturated solutions of potassium sulphate at 34° C., and were taken out at intervals superficially dried, and weighed. Similar samples, which had been soaked in the solution for 11 days at 34° C., were dried in a desiccator at 34° C. to constant weight.

The absorption and desorption curves are shown in Figure 5. It will be seen that in both cases, on drying, the weight falls to a little below its original value before immersion. If, as seems probable, this is due to extraction of water-soluble substances, it may be assumed that the later part of the absorption curve has been somewhat flattened thereby.

The analysis of the absorption curves is shown in Table 2.

TABLE 2

	Time Occupied—Hours	
Portion of Cure	Tape	Vulcanized Latex Sheet
0 to ½-saturation (t_H)	0.5	2.0
½ to ¾-saturation (t_h)	2.7	15
¾ to ⅞-saturation (t_h)	3.8	55

The following results, which are in accordance with the osmotic theory, will be noted from the table:

The shape of the time-absorption curve differs from that of the normal gas absorption curve in the manner predicted. The half-value-period t_h in lines 2 and 3 is much greater than the value of $1.43t_H$ appropriate to a simple gas, and increase with time.

The departure from the form of the normal gas-absorp-

[7] Leopold and Johnston, *J. Amer. Chem. Soc.*, 49, 1924 (1927).

tion curve is more marked with one rubber (vulcanized latex) than the other; the curves cannot be superposed merely by an adjustment of the time scale of one curve. This would be expected if the shapes of the humidity/absorption curves differed.

Similar effects were shown in absorption and desorption curves with a specimen of rubber C. The technique was similar except that the liquid was distilled water, which was renewed frequently to avoid contamination. The results are shown in Figure 6.

Variation of Saturation or Drying Period with Thickness

The theory of Andrews and Johnston[2] that the time taken to reach a given stage of saturation varies as the square of the thickness of the sheet can easily be shown to be consistent with the new equation (3), as well as the old equation (1).

The experimental results of Andrews and Johnston are, therefore, consistent with the new theory, as also are those of Boggs and Blake,[3] who found that, with sheets of different thickness of one rubber, the early portions of the time-absorption curves coincided when absorption was expressed in terms of gain in weight per unit surface area. This result follows from either theory if the time-absorption curves are parabolic, as is the case with the curves in question within the accuracy of measurement of the printed curves.

Van Harpen[4] has shown that "time of drying" of raw rubber varies as the square of thickness of the sheet.

Drying Curve

According to equation (1), the time curve for a gas diffusing into a sheet is simply the inverse of that for a gas diffusing out. This is not the case for water vapor behaving in accordance with equation (3).

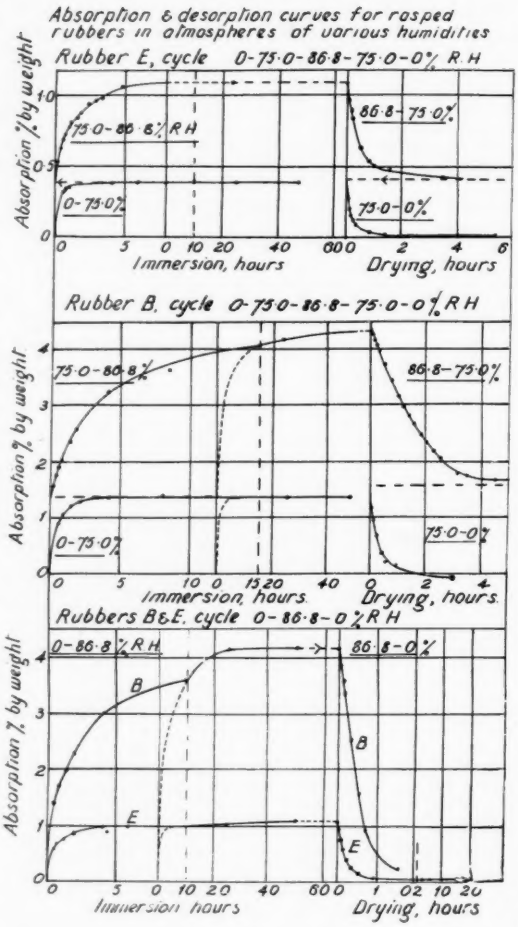
One would expect the shape of the desorption (or drying) curve to differ from that of the absorption (or soaking) curve in that the approach to the asymptote would not be so slow in the former case, especially in the later stages of the process. The time "constant" $\frac{4a^2 \frac{\partial c}{\partial h}}{\pi D^1}$ should now decrease with time instead of increasing, causing the final approach to the end-point of the drying process to be much quicker.

The time required for the loss of a given amount of water from saturated rubber should be very much less than that required for the absorption of the same amount by dry rubber. The bulk of the water is absorbed under the influence of a low osmotic pressure difference in soaking and is lost under the influence of a high osmotic pressure difference in drying.

If the humidity changes were confined within narrow limits so that $\partial c / \partial h$ remained constant over the whole range, the differences between the shapes and time-scales of the absorption and desorption curves should disappear.

The relative shapes and time-scales of the absorption and desorption curves are shown in Figures 6 and 7. There the drying was so rapid that it is not possible to analyze the curves accurately, but it will be seen that in drying there was no very slow approach to the final value as in absorption, and that both samples were dry within a very short time compared with that required or saturation.

The main object of the next experiment was to study the relative rates of attainment of equilibrium in absorption and desorption over various restricted ranges of humidity under conditions of rapid attainment of equilibrium, and, therefore, less risk of interference by oxidation. In particular, it was intended to obtain confirmation of the prediction from the osmotic theory that over a humidity range so small that the humidity-absorption relationship could be considered linear, the half-saturation and half-drying periods would be equal. Unfortunately, accurate determinations under such conditions are extremely difficult, and the experiments were, therefore, confined to demonstrating a simpler case of the same problem, *viz.*, that if a given humidity range is divided into two smaller ranges so that the humidity-absorption relation is more nearly linear in each small range than over the whole range, then in each small range the half-saturation and half-drying periods will be more nearly equal than those for the whole range. It was intended, also, to compare the shapes of the absorption and desorption curves, although the actual shape in either case could not be predicted, owing to the irregularity of size and form of the finely divided rubber.



Figs. 7, 8, and 9

The rubbers used for these tests were B and E (Table 1). They were finely divided by rasping, spread on watch glasses, and exposed at 20° C. to atmospheres of one humidity, weighings being taken at short intervals up to equilibrium. The watch glasses were then transferred to jars containing atmospheres at other humidities as required, and the process repeated. Each of the two rubbers was subjected in this way to the following cycles of exposure:

(*a*) 0% R.H.—86.8% R.H. (sodium sulphate)—0% R.H.

(*b*) 0% R.H.—75.0% R.H. (sodium chloride)—86.8% R.H.—75.0% R.H.—0% R.H.

The absorption and desorption curves are shown in Figures 7, 8, and 9.

The value of t_H under various conditions are shown

[4] *Ind. Eng. Chem.*, 18, 224 (1926).

in Table 3, together with the ratio of t_H for rising and for falling humidities.

TABLE 3

Rubber	Humidity Range, % R.H.	t_H in Min. for Rising Humidity (H.S.P.)	t_H in Min. for Falling Humidity (H.D.P.)	Ratio H.S.P./H.D.P.
B	0–86.8	84	24	3.5
	0–75.0	18	15	1.2
	75.0-86.8	160	73	2.2
E	0–86.8	27	9	3.0
	0–75.0	<10	6	<1.7
	75.0-86.8	42	18	2.3

It is seen that the osmotic theory is confirmed in that: (*a*) the ratio half-saturation-period (H.S.P.)/half-drying-period (H.D.P.) for the smaller ranges of humidity 0-75.0% and 75.0-86.8% is greater than unity, but is nearer unity than for the whole range 0-86.8%, and very much less than that observed in previous experiments (Figures 5 and 6), with still larger ranges of 0-100% and 0-96.5%; (*b*) the higher the hygroscopicity of the rubber, and the higher the mean humidity of the atmosphere during the change, the greater is the value of t_H.

In Figures 7, 8, and 9 the difference in shape between absorption and desorption curves is very noticeable where there is a wide change of humidity. The drying curve is comparatively straight at first, and sharply curved at the end. The reverse is found in the absorption curve. This difference is not so clear in the more restricted changes of humidity, particularly over the range 0-75% R.H., where $\partial c/\partial h$ is known to be nearly constant.

Conclusions

Predictions based on the differential equation (3) are substantially confirmed by the results of various workers, and the simpler gas diffusion equation (1), which is usually assumed, is shown to be inapplicable to the case of water vapor in rubber.

When a sample of rubber changes from equilibrium at one humidity to equilibrium at a much higher humidity, the time-absorption curve is characterized by a rapid initial rise and an approach to equilibrium much more prolonged than if the simple gas-diffusion equation applied. The higher the humidity being approached, and generally, the greater the hygroscopicity of the rubber, the more marked is this slowness of approach to equilibrium.

When a sample of rubber changes from equilibrium at one humidity to equilibrium at a neighboring humidity, the time required for, say, half the change in water content increases with the mean humidity, and, generally, with the hygroscopicity of the rubber.

When desorption takes place in a sample of rubber changing from equilibrium at one humidity to equilibrium at a considerably lower humidity: the early part of the time/water content curve is comparatively straight, and the approach to equilibrium fairly abrupt; the time required for, say, half the change in water content to occur is much less than the corresponding time in the process of absorption between the same humidity limits; the smaller the range of humidity over which the change occurs, the more nearly is the curve similar in shape and time scale to that which would occur with a rising humidity over the same range.

When rubber sheets which are identical except in thickness are subjected to changes in ambient humidity, the time required for, say, half the change in water content to occur varies as the square of the thickness. In this respect there is no difference between the predictions of the old and new diffusion equations.

More generally, we may say that the time relations in absorption and desorption of water vapor in rubber are determined very largely by the shape of the humidity-absorption curve for the particular rubber under consideration, and that the further study of such relations in connection with practical problems demands a solution of the new differential equation.

Future progress in the application of the osmotic theory to a number of practical problems, some of which are indicated, will depend largely on the solution of a differential equation of the type:

$$\frac{\partial h}{\partial t} = D^1 f(h) \frac{\partial^2 h}{\partial x^2}$$

in which the form of the function $f(h)$ varies with the water-absorbing constituents of the rubber.

Acknowledgment is made of the kindness of the Board of Management of the Rubber Research Association in permitting the publication of this investigation, which was communicated to its members as *Laboratory Circulars*, Nos. 98 and 108, June, 1932, and February, 1933.

Truck Tire Carcass

(*Continued from page 40*)

Zenite stock. Both stocks show the same type of tear on the various cures, which indicates a similarity in rate of cure. Both stocks have about the same brittleness when hot. However advantage may be taken of the better physical properties of the Zenite-#8 compound by curing somewhat on the underside, which gives a stock which is less brittle, when hot, than a tight cure. A moderate undercure on this stock still gives a low hysteresis loss with good tensile and modulus. This does not follow with straight mercaptobenzothiazole or its salts. In most cases the compounds accelerated with Zenite 0.4-#8 1.0 will prove most satisfactory.

The combination of Zenite and #8 does not need excessive amounts of fatty acid for activation, which is also advantageous for reducing brittleness and hysteresis loss. The palm oil used in these recipes had an acid number of 100. The rosin and palm oils used may be replaced by other commonly used softeners to suit the requirements of individual manufacturers. When making such a replacement from 0.5 to 0.75% of stearic acid is suggested. If the Accelerator #8 is dropped below 0.75% on the rubber, there is a definite increase in the hysteresis loss so it should be kept relatively high and the Zenite varied to produce the desired rate of cure.

These combinations are best adapted for curing at 250° to 267° F., which means a tire cure between 260° and 270° F.

It has also been found that these Zenite-#8 ratios are compatible with most activated Zenite tread stocks. One of the following three stocks should prove satisfactory:

Tread Compound No. 1231	-248	-235	-249
Smoked Sheets	100.	100.	100.
Zinc Oxide	5.	5.	5.
Channel Black	50.	50.	50.
Stearic Acid	2.	2.	2.
Pine Tar	1.5	1.5	1.5
Thermoflex A	1.4	1.4	1.4
Neozone D	0.6	0.6	0.6
Zenite	0.6	..	0.6
Accelerator #8	0.75	..	..
Zenite B	..	1.	..
Accelerator 808	..	..	0.3
Sulphur	3.	3.	3.

Stock 1231-235 is the best for abrasion and flex-crack resistance, but it is not quite so compatible with a Zenite-#8 accelerated carcass as tread stock 1231-248. Stock 1231-249 is very close to -235 in quality, and its compatibility with the Zenite-#8 carcass lies between the other two.

Editorials

Mediation or Dictation

A CERTAIN company manufacturing rubber goods has been operating under a labor contract embodying a provision for termination at the end of six months upon thirty days' notice and also a provision for a three-point program for the adjustment of controversy before any interruption of manufacturing activities should occur. The specified media in attempting settlement were: first, discussion between company and local union representatives; second, the inclusion of international union officers in the conference; and third, submission to outside mediators. Sixteen days before expiration of the six-month period the company received a demand for increased pay and replied that it was unable to make the increase. Refusing unbiased mediation urged by the company, the union called a strike and then insisted that a Certified Public Accountant go over the company books and report back to the union.

This action is certainly evidence of bad faith and lack of responsibility by the union organization to carry out the provisions of the contract. Moreover it indicates a desire not to cooperate for the mutual benefit of the employes and employer, but rather to dictate and force upon the company a precedent which is entirely outside the realm of fair dealing. Once established, this practice would have great possibilities of leading to demands for a closed shop and the check-off, both of which practices are coercive in nature and contrary to the fundamentals of American liberty.

In such instances where there is a lack of responsibility of contract or realization of the rights of others, legislation is necessary or public opinion should be invoked to assert its influence. Strong concerted action by those interested in equitable consideration will impress upon legislators and the people at large the necessity of preserving inviolate the principles of personal rights.

Cooperative Research

TO THE New York Group, Rubber Division, A.C.S., on October 15, William C. Geer presented a plan for the collaboration of individual rubber companies in a central cooperative laboratory for fundamental research of a forward looking character.

In working out details of such an arrangement many now visioned obstacles undoubtedly would be overcome. It would require complete whole-hearted elimination of selfishness on the part of individual supporters, ever keeping in mind the possible benefits to the industry as a whole and the subordination of early monetary returns.

Probably the more important among the arguments for this plan are: first the great reduction in duplicated effort now arising from individual initiative and from the desire to analyze successful products of others as a starting point in attempting to improve upon those materials; and second, the elimination of distraction through complete divorcing of pure research from so-called practical application problems.

However its perpetuation would require elimination of a number of tendencies which have been fostered by competitive business methods. The spirit of competition would need to be restricted to the application to manufacture and merchandising. Domination by any portion of its backers could not be tolerated. Insurance against preferential consideration would require careful definition of licensing conditions.

Cooperative undertakings are dependent on a broad unity of purpose, a spirit of flexure to that end. Certainly the goal is such as to warrant its serious consideration.

"Split-Train" Bill

ANOTHER of the contributing factors to higher manufacturing and delivered costs of merchandise to the consumer is the contemplated legislation to limit the length of freight trains. It has been stated that passage of this measure would require running of eighty-seven million additional train-miles to handle the volume of traffic carried in 1930 or sixty million more to accommodate haulage equivalent to that in 1936.

It is reasonable that the larger number of train units would result in increased congestion and hence greater liability to accidents through grade crossing and train collision exposure. In addition to the element of safety a material objection to this measure is the estimated increase in operating costs of one hundred million dollars annually. This expense would very likely be passed on to the manufacturer and ultimate consumer, thereby tending to decrease the volume of merchandise to be enjoyed by the public and increase the percentage of industrial overhead.

Railroad operation is of positive interest to industry, and traffic managers should be encouraged to express their views on this matter.

S. C. Stillwagon

EDITOR

What the Rubber Chemists Are Doing

A. C. S. Activities

Detroit Group

THE fall meeting of the Detroit Group, Rubber Division, A.C.S., was held at the University Club on September 29, attended by an enthusiastic crowd of 125. The Detroit Group was more than pleased to have present representative groups from Akron, Chicago, and New York.

Following the regular order of business, John Wilson, technical director of the British Rubber Research Board, was introduced and responded with a brief, but interesting greeting to the Detroit Group. E. B. Curtis, of R. T. Vanderbilt Co., then entertained the group with some well-chosen episodes in his career as a rubber chemist. Dr. W. G. Nelson, of United States Rubber Products, Inc., was the technical speaker of the evening, and his illustrated lecture on rubber testing was greatly appreciated. In addition to his talk the slides illustrating the various tests and testing apparatus pictured many new and interesting developments in this field.

The date of the Christmas meeting has been tentatively set for December 8. Notice of place and speakers will be announced as soon as these details are settled.

The acceptance by the executive committee of the Rubber Division of the A.C.S. of the invitation to hold its spring meeting in Detroit was announced, and plans are under way to make this affair a success.

Los Angeles Group

LOS ANGELES GROUP, Rubber Division, A. C. S., held its first meeting of the new season at the Hotel Mayfair on October 5 with a record attendance of 96, including eight new members. As dinner favors, a cocktail, hors-d'oeuvres pick holder, made of zinc alloy was found at each plate donated by New Jersey Zinc Co. through Art Wolff.

E. H. Lewis, vice president, Western Insulated Wire Co., gave a five-minute trade talk on rubber covered wire, the newest Pacific Coast rubber product. He made several surprising statements regarding the speed of production and the special compounds necessary to fit the various needs of industry for cable and insulated wire.

Al Sperry, president of the Dunkers Union, with a membership of 760,000 explained in detail the purpose of this union for the protection of the dunkers whether the object of affection is doughnuts, rolls, or toast. A complete course was also given in "When, Where, and How to Dunk."

Rex Thomson, superintendent of charities, Los Angeles County, and famed the world over for efficient and yet effective handling of the relief problem, gave all the members something to think about. He stated that 65% of all the taxes paid by Los Angeles residents is being passed out for relief. Whereas employment and payrolls have steadily increased, in place of a reduction during the past two years, expenditures for relief have more than doubled. According to Mr. Thomson, California promises to be the poor house of America, with real estate property considered a liability rather than an asset.

The membership was then given an opportunity to see the movies of the annual fishing trip enjoyed by 39 members on August 8. Proudest was Doc Hutchinson (Firestone) with his broken pole. Most satisfied was Carl Stentz, (Arrowhead Rubber Co.) eating his sandwich.

This was followed by a second movie covering the history of aviation entitled "Ceiling Unlimited" through courtesy of the Union Oil Co. and United Films.

The door prize of a musical cigarette box, donated by Lee Horchitz (Goodrich), was won by R. R. James (Goodyear). Bill Holmes, of Dill Manufacturing Co., kindly contributed a beautiful Fizz Bottle set together with cocktail shaker, glasses, and tray for the raffle, which was won by Frank Shew (Darnell Corp.).

N. Y. Group Contribution to *Rubber Chemistry and Technology*

In recognition of the valuable service being given by *Rubber Chemistry and Technology* to chemists and technologists in the rubber industry the Executive Committee of the New York Group voted on October 15 to donate $250 toward its publication expenses. The recording in convenient form of technical articles relating to research and development accomplishments affecting the rubber industry is of definite worth as a reference and in making available the results of work done by those who are continually making advancements in rubber research and technique.

New York Group

THE New York Group, Rubber Division, A.C.S., held its fall meeting on October 15 at the Building Trades Employers' Association clubrooms, New York, N. Y., with 203 members and guests in attendance. After a turkey dinner, the program of entertainment and two excellent speeches followed. Enthusiastic interest by those present was manifested in the close attention given to the speakers.

W. C. Geer, in a talk on "Research Cooperation in the Rubber Industry," urged the formation of a joint cooperative laboratory for fundamental research to be supported by the rubber industry. Dr. Geer pointed out that rubber research at present is largely confined to practical and immediate problems without enough attention being given to problems of a more basic nature. Two main objectives were cited: the first is to achieve a warmer cooperation among the units of the industry, and secondly to strive for a new foundation for the rubber industry of the future. A practical outline was submitted for carrying out such a plan of research.

The second paper, presented by D. C. McRoberts, was on "The Kaysam Process," in which it was pointed out that Kaysam is definitely a process and not a raw material or the name of a finished product or class of products. This process, which was described in detail from both theoretical and practical viewpoints, was indicated to be a latex casting or molding process which would render possible the application of latex to thick, massive, and irregularly shaped rubber products. The gelling action and uniform shrinking, upon which the Kaysam process depends, was explained thus: upon beating, the repellency of the solid particles in suspension is modified to allow the particles in head-on collision only to cohere; consequently chain-like formations occur that bridge to form hollow cubes until the entire mass is a uniform textured and open network of solids; as the solid and liquid phases are continuous, uniform shrinkage takes place upon drying. The Kay-

sam process essentially comprises the addition of heat-sensitized latex to molds of heat conducting material and immersing the molds in warm water. After sufficient time is allowed for gelling, the mold is opened and the molded product is dried and vulcanized. After the meeting, great interest was shown by many who examined the numerous exhibits and questioned the speaker for information regarding this comparatively new process.

Announcement was made of a nominating committee consisting of P. R. McCampbell, I. B. Kleinert Rubber Co.; D. F. Cranor, Binney & Smith Co.; and R. R. Lewis, Vulcan Proofing Co., who were named to report on officers for 1938 at the December meeting. B. B. Wilson, of India Rubber World, secretary-treasurer, and P. P. Pinto, of the *Rubber Age*, were named chairman and vice chairman, respectively, of the program committee for the Christmas party.

Chicago Group

THE Chicago Group, Rubber Division, A.C.S., has scheduled its October meeting for Friday, October 29, at the Hotel Sherman, Chicago, Ill. The technical portion of the program which follows the dinner and floor show includes a talk by H. B. Townsend, of the Vultex Chemical Co., on "The Use of Vulcanized Latex in Industry."

A.C.S. Commemorates Chandler Centennial

A MONTH'S celebration of the hundredth anniversary of the birth of Charles F. Chandler, pioneer industrial chemist and founder of the School of Mines of Columbia University, was opened on October 6 through the cooperation of Columbia University and the American Chemical Society.

The opening lecture, held at Columbia University, was on "Man-Made Molecules," by Thomas Midgley, Jr., vice president of the Ethyl Gasoline Corp. According to Mr. Midgley, whose talk traced the history of the development of synthetics, man's latent desire to change his environment caused him to turn his attention to the production of molecules previously unknown. Earlier developments were the result of fortuitous accident. In recent years, however, systematic research has resulted in the majority of our synthetics. Mr. Midgley showed that during the past 100 years the number of synthetics developed has increased steadily each year until about 1914 when a decided acceleration took place and has since been maintained.

In conclusion, a sound film depicted the development of the present-day automobile with its high-compression engine. The development of tetra-ethyl lead, which when added to gasoline reduces the knocking in high-compression engines, was due to systematic research based on the periodic classification of the elements.

The program for the remainder of the month includes lectures on "Certain Recent Developments in Chemistry and Their Bearing on Cellular Activity," "New York's First Public Health Chemist," and "Chemical Nature and Mode of Formation of Pepsin, Trypsin, and Bacteriophage."

Divisional Officers

THE American Chemical Society, with membership over 20,000, October 9 announced the election of 65 chemists to administrative and editorial posts in the society. Among the divisional officers named are: Division of Industrial and Engineering Chemistry, executive committee, Thomas H. Chilton, of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., Charles A. Thomas, of the Monsanto Chemical Co.; Division of Colloid Chemistry, secretary-treasurer, Ernst A. Hauser, Massachusetts Institute of Technology, Cambridge, Mass.

London Rubber Conference Program

THE Rubber Technology Conference, to be held in London, England, in May, 1938, under the auspices of the Institution of the Rubber Industry, will be supported by the Rubber Division, American Chemical Society, through a committee headed by Dr. A. A. Somerville. A general program has been announced outlining the scope of the Conference.

Part I. Methods of Improving and Evaluating the Durability of Rubber

1. Manufacturing Conditions, including Compounding.
2. Uses of "Synthetic Rubbers" and Allied Plastics.
3. Testing Methods, including Performance, Chemical, Physical, and Accelerated Aging Tests.

Part II. General Subjects

1. Chemistry and Physics of Latex and Rubber.
2. Technology of Latex and Rubber.
3. Rubber Derivatives and Their Uses.
4. Raw Materials of the Rubber Industry. Compounding Ingredients, Solvents, Varnishes and Finishes, Fibers and Textiles.
5. Manufacture of Particular Goods. Tires, Belting, Electric Cables and Insulation, Footwear, Sports Goods and Toys, Hose, General Mechanicals, Roads and Flooring, Surgicals, Textile-Rubber Goods, Sponge and Cellular Rubber, Hard Rubber.
6. Machinery and Appliances, Steam and Heat. Water, Automatic Control, Layout, Transport, Packing, Storage, Maintenance.
7. Organization and Administration. Technical Education, Production Planning and Efficiency, Safety and Welfare, Costing, Marketing, Economic Problems.

X-1 Resinous Oil

AN INEXPENSIVE coal-tar product, known as X-1, recently appeared on the market for use as a softener and plasticizer for rubber and Neoprene. This product, manufactured by The Neville Co., Pittsburgh, Pa., is a dark-brown viscous liquid at ordinary temperatures. It has a specific gravity of 1.05-1.15 at 15.5° C. and is only slightly soluble in benzol.

When up to 10% of X-1 is used with Neoprene, it is claimed to improve the stability and act as a softener without adversely affecting the physical properties of the stock. Increasingly larger amounts of X-1 will produce a more pronounced softening effect, and eventually a stock of very soft, tacky properties will be obtained. Neoprene stocks with large amounts of X-1 retain their curing properties. This new material also is being used as an oil in rubber reclaiming operations.

Preservatives

A NUMBER of materials used in the rubber and latex industries tend to mold, ferment, or decompose. The three preservatives described here may suggest applications in the above fields.

Moldex, recommended for adhesives, textiles preparations, and paper compounds, is used for the preservation of water solutions and emulsions containing vegetable gums, casein, glue, gelatine, albumen, starch, etc. Moldex is a light colored, crystalline powder with faint odor. It is slightly soluble in water and readily soluble in alcohol, glycerine, and the glycols. In general, 18 ounces of Moldex are sufficient for 100 gallons of liquid.

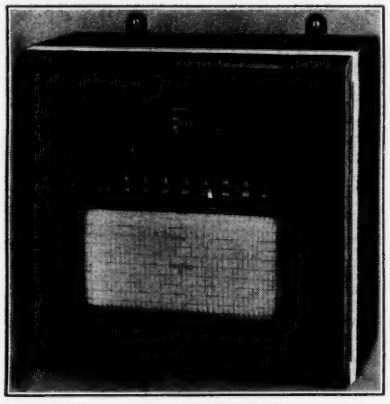
Aseptex, a white powder, is used for the preservation of the same materials as Moldex. It thickens solutions of casein, glue, gelatine, and albumen.

Rancidex is recommended for retarding rancidity in preparations containing animal or vegetable oils. In certain cases in rubber compounding where oils of this type are used, the addition of $^{1}/_{10}$% of Rancidex will act as a preservative for the oils. It is also recommended for use in textile and leather fields.

Latex Preservative

COLLATONE, an alkali compound of parachlorometacresol, is used as a preservative for latex compounds and latex compounding materials such as casein that furnish a growing medium for molds and bacteria. Readily soluble in warm water, Collatone does not impart an unpleasant odor, cause discoloration, or affect the solubility of albuminous material present. In most cases one to two pounds of Collatone are effective in preserving 1,000 pounds of material. In addiiton to its application to latex compounding, this preservative is used in other industries.

New Machines and Appliances



Bristol Pyrometer

Wide-Strip Pyrometer

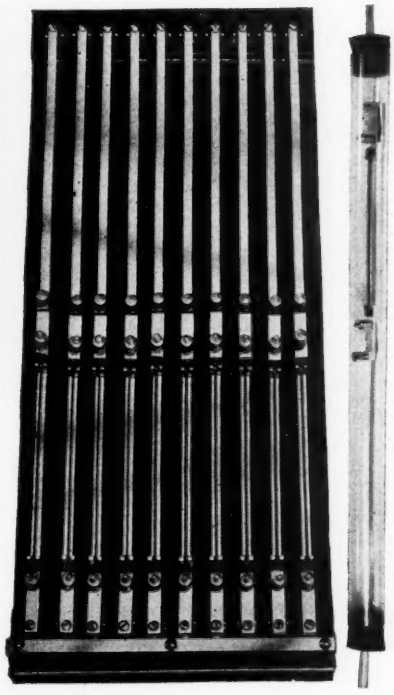
A WIDE-CHART industrial instrument, operating on the potentiometer principle, was recently developed for single or multiple temperature recording. The pyrometer essentially comprises a potentiometer circuit and Weston galvanometer, a mechanism for balancing the circuit when temperature changes occur, and an indicating and recording system. Charts used for recording are 12¼ inches wide. Mounted above the chart is a large indicating scale, easy to read at a distance.

The pyrometer, being self-balancing, self-standardizing, and self-compensating for cold-junction temperature changes, is automatic in operation. In the balancing mechanism all mechanical backlash is taken up, making it possible to magnify minute deflections of the galvanometer.

Among the various models available are the single-record, two-point continuous-record, and the multiple-record for recording from two to six temperatures simulaneously. The Bristol Co., Waterbury, Conn.

Permanent Set Apparatus

A SMALL compact apparatus, recently developed, provides for simple and efficient measurement of the permanent set of rubber compounds. The standard outfit consists of ten elongation units, 14¼ inches long and made from non-corrosive metal, with a mahogany supporting frame. Each unit comprises a bar with two holders; one fixed at one end, and the other sliding on the bar to permit elongation up to 500%. The rubber specimens, similar to conventional T-50 samples in size, are clamped securely in both holders. The sliding member which holds one



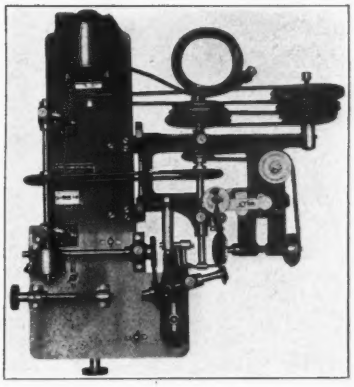
Permanent Set Outfit and Single Unit in Glass Tube

end of the sample is extended to give the predetermined elongation, where it is held by a set screw. At the end of the stretching time the tension is released, and permanent deformation is measured in the customary manner.

In applying this apparatus to a procedure which requires holding the rubber in elongation for 30 minutes, releasing, and measuring the set after 10 minutes, it is claimed that with the ten units one operator can work continuously, replacing one test piece each three minutes and making necessary measurements. These units are small enough in width and thickness to be placed inside of a one-inch glass tube; hence permanent set under various conditions of atmosphere, temperature, etc., can readily be taken. It is reported that the apparatus, because of its size, opens new experimental possibilities which could not be undertaken with the equipment and methods now in general use. Henry L. Scott Co., Providence, R. I.

Mechanical Goods Trimmer

A MACHINE has recently been developed for trimming molded rubber goods. The trimming mechanism is hinged to the base, permitting it to



Morris Trimming Machine

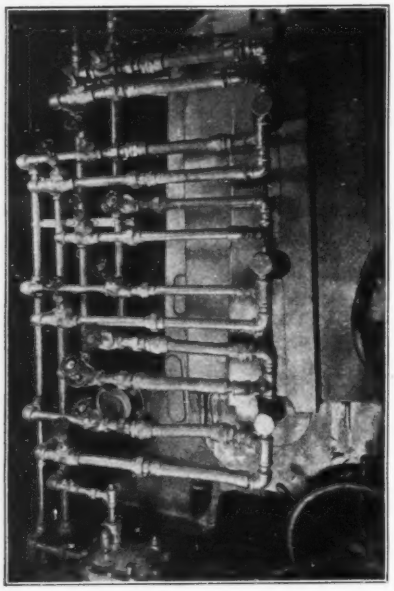
be used in either horizontal or vertical position. The usual application is in trimming round or circular objects up to six inches in diameter with the trimming assembly in the horizontal position, but when in a vertical position, other shapes may be accommodated. The illustration shows a top view of the machine when set for horizontal use.

The motor drives the main shaft through reduction pulleys which allow for three different speeds. The main shaft, which is also one of the knife shafts, in turn drives the knife shaft at right angles to it through an idler pulley. The countershaft at the front of the machine is driven by the main shaft and is connected to the trimming shaft, where provision is made for attaching dies to support the goods and for the adjustment of trimming angle up to 68 degrees from its normal position. The table that supports the stand is provided with knurled hand screws for adjusting the position of the trimming shaft according to the size of the pieces to be handled.

The machine is said to accommodate goods with the mold overflow in the center of peripheral surface or at both ends in case of short objects. When the trimming operation is completed, the piece is mechanically removed from the trimming die. T. W. Morris, 6312 Winthrop Ave., Chicago, Ill.

Flexible Metal Hose

THE accompanying illustration shows the application of flexible bronze hose to the steam and water lines of a three roll calender. The metal tubing made of fatigue-resisting bronze and of extra-heavy wall, accomplishes two purposes on this installation: it com-



Rubber Calender with Rex-Weld Hose

pensates for contraction and expansion of rolls when they are alternately steam heated and water cooled, and it allows for free motion of the rolls during operation of the calender.

This type of tubing is also of value in platen press installations where vibration and bendings stresses frequently occur. Chicago Metal Hose Corp., Maywood, Ill.

Valve and Tube Vulcanizer Set

FOR attaching rubber base valves or repair patches to inner tubes the No. 8900 vulcanizer set consists of a vulcanizer and ten rubber-covered replacement valves with a "Hot Patch" heat unit for each valve. The vulcanizer is supplied with two interchangeable spiders: the larger size is for valve replacement; while the smaller is for patch application. The "Hot Patch" heating unit consists of an inflammable chemical composition in a shallow metal pan with a hole in its center for inserting the valve stem.

In valve replacement work the valve is placed over the valve hole in the tube. A heating unit is slipped over the valve stem with the metal pan against the upper surface of the valve base. The neck of the valve is inserted in the hollow stem of the clamp, and the long prongs of the spider are fitted into the notches of the heating unit pan to apply pressure. The tube section is clamped against the base pad by forcing down the quick-acting pressure clamp. Final pressure is applied by turning the thumbscrew down until the valve base is completely hidden by the pan. The heating unit is then ignited, which furnishes the heat for vulcanization. After cooling, the tube is removed, and the operation is complete. In patch repair work the same general procedure is used.

Advantages claimed for this vulcanizer are operating simplicity, assurance of perfect valve alinement, and uniform pressure distribution. It can be used for any size of tube from a bicycle size to the largest truck and bus tube made. Three sizes of heat units provide automatic heat control. A. Schrader's Son, Division of Scovill Mfg. Co., 470 Vanderbilt Ave., Brooklyn, N. Y.

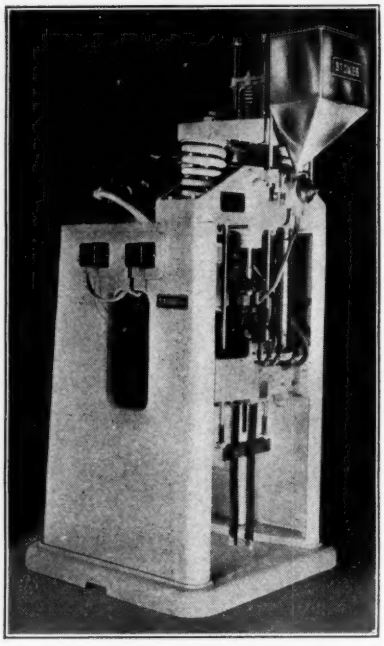
Schrader Tube Vulcanizer

Automatic Molding Press

A MACHINE, fully automatic in operation, molds thermo-setting plastics of the phenolic base and urea compound types. The press is a self-contained unit, requiring only electrical and air connections. The machine occupies a floor space of 36 by 42 inches and stands 78 inches high. A separate 1/50 h.p. control drive motor, with speed reducer, is operated by a Microflex Reset Timer. The machine is safeguarded against damage by up-stroke and down-stroke limit switches, and an operation check. This automatic check insures continuous operation or stops the machine if there is an interruption in the flow of molded parts. An adjustable metering device feeds the proper amount of molding powder from the hopper.

The press performs automatically all operations of the molding cycle: filling the mold, closing, cleaning by air-jets, curing, opening mold, ejecting the finished part, and cleaning the mold. The press can be set so as to permit trapped gas to escape. Molding time, which depends on the size of the article, varies from two to seven minutes. Changing molds and setting controls for producing different parts requires from 30 to 60 minutes.

This machine will accommodate pieces from one inch to 1¾ inches in depth, depending on the shape. F. J. Stokes Machine Co.



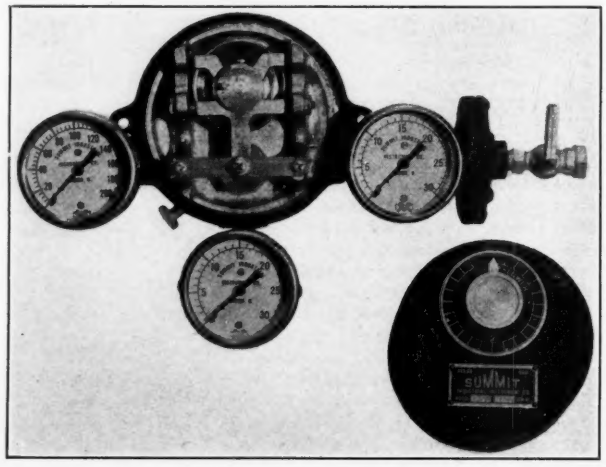
Plastic Molding Machine

Air Operated Pressure Controller

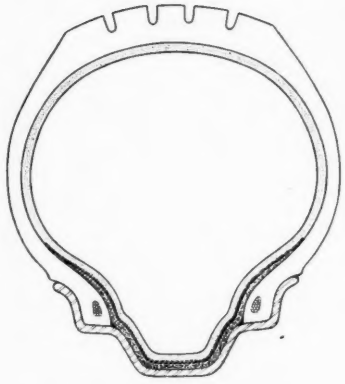
THE Summit air operated pressure controller, model No. 19, is applicable to any pressure reduction of steam, air, water, or gas ranging from two to 500

(*Continued on page* 80)

(*Right*) Summit Control Unit



New Goods and Specialties



U. S. Royal Master Safety Tube

New Safety Tubes

A NEW U.S. Royal Master safety tube, with a laminated 3-ply base, is said to overcome tube failures due to pinching, abrasion, rust, and corrosion. The new laminated construction gives extra protection at rim side, extending over that part of the tube which comes into contact with the steel rim and upward in the walls beyond the toes of the beads. This new tube is an all-black, high carbon, heavy gage tube of great tensile strength, which is claimed to provide tremendously increased resistance to excessive tire heat of modern high-speed driving and splitting or tearing in ordinary punctures.

Its companion, the Peerless tube, has a laminated 2-ply base for protection against side wear. U.S. Tire Dealers Mutual Corp., 1790 Broadway, New York, N. Y.

Rubber Rolls for Thresher[1]

BECAUSE of the peculiarities of Punjab flax grown extensively in California, a recently designed threshing machine embodies the use of rubber covered rolls. Previous observations indicated that the usual peg tooth cylinder could not be used on this type of flax with success.

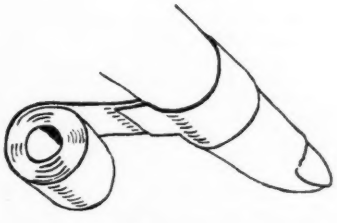
The thresher comprises a feed table, two rubber-covered steel rolls, and a cleaning shoe of somewhat standard construction. The machine is fed by hand, and the tailings from the shoe are returned by hand to the rolls for threshing. The threshing rolls consist of steel drums 8 inches in diameter and 12 inches long, with a ¼-inch layer of very hard rubber vulcanized to them. The lower roll is supported in plain bearings bolted to the main frame. The upper roll is mounted in bearings which are in turn mounted in guides. This construction permits the upper roll to raise when wads of flax straw pass through. Each bearing on the shaft of the upper roll is loaded with a compression spring, having a constant of approximately 75 pounds per inch of deflection.

[1] Abstracted from "A Flax Seed Plot Thresher" by R. Bainer and J. S. Winters in *Agric. Eng.*, Aug., 1937, pp. 363-64.

Vassar Hair Waver

Rubber Hair Curler

A THIN strip of rubber with a lengthwise slit midway between the ends and a hole in one end is used as a hair curler. The ends of the hair are inserted in the slit; the curler is rotated the proper amount, and the knob end of the curler is pushed through the round hole in the other end. These curlers are claimed to have distinct advantages over similar metal devices as they will not catch or cut the hair; there are no working parts to get out of order; and they are comfortable to wear. W. J. Caley & Co., Inc.



Nu-Hesive Taping

Self-Adhering Bandages

NU-HESIVE surgical dressings are made of sterilized open-mesh gauze impregnated with a non-absorbent cohesive material, leaving the interstices of the gauze partially open.

Reported to heal wounds faster because of its non-absorbent property, Nu-Hesive is self-adhering and will not stick to the wound or skin. It is also recommended for orthopedic strapping and athletic taping as it eliminates itching, is easily applied, and painlessly removed, and permits bathing freely.

Another Nu-Hesive product is the Dia-Dressing used for compress purposes in connection with Nu-Hesive bandage. Diadem, Inc.

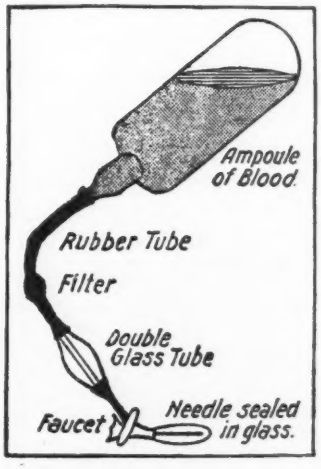
Pliolite-Base Enamel

PLI-NAMEL has been developed as a coating for interior concrete walls and floors. This enamel has the characteristic qualities of Pliolite, which is its basic ingredient. Pli-Namel is not affected by the chemical action of lime salts or other minerals in the concrete. It is said to overcome concrete dusting, withstand moderately heavy traffic, and resist the action of gasoline, oil, and chemicals. Available in a variety of colors, it is said to dry with a high permanent gloss and under usual conditions will cover from 450 to 500 square feet per gallon. The Glidden Co.

Novel Application of Rubber Tubing

RUBBER tubing is an essential feature of the blood transfusion apparatus developed by Dr. Frederick Durán Jordá for use in the present Spanish conflict. Special refrigerator cars carry the preserved blood to the front. The blood is sealed in glass ampoules under a pressure of two atmospheres. The tip of each ampoule is sealed into a rubber tube attached to a double tube of glass for observing the flow of blood, and at the end is a glass-tipped sterilized needle with a faucet for regulating the blood stream.

After the wounded man is prepared for transfusion, the tip of the ampoule within the rubber tube is broken. The fragments of glass are retained by a filter inserted in the tubing. The glass covering of the needle is then broken, and the pressure within the ampoule starts the blood flowing.



Blood Transfusion Apparatus

Rubber Industry in America

EASTERN AND SOUTHERN

INDUSTRIAL sentiment is not particularly optimistic. An attitude of watchful waiting prevails, but no serious business depression is expected.

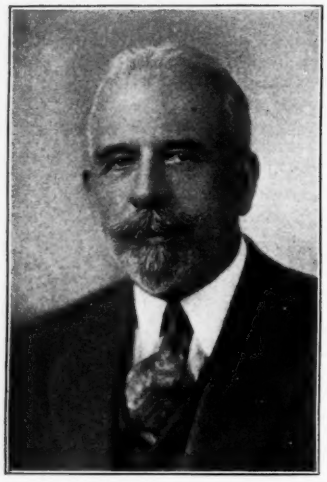
The South continues with a fine showing, but not so high as previously. Good crops are expected. Employment slightly improved, but the demand for workers was not so large as anticipated, chiefly owing to lagging production in some lines. Cotton gathering continues, and the labor shortage seems a thing of the past. Sales of household appliances are well ahead of last year's figures. Wholesalers report heavy purchases of holiday gift goods for the Christmas season.

The longer cotton staple has added to farm income. No accurate record of cotton quality was kept in this country before 1928, reports the United States Department of Agriculture. From 1928 to 1934 the average increase in staple length amounted to about 1/32-inch. It is estimated that this increase in staple length added more than $8,000,000 to the value of the 1934 cotton crop.

MEMA New Members

According to A. H. Eichholz, general manager, Motor & Equipment Manufacturers Association, 250 W. 57th St., New York, N. Y., 16 more manufacturers of automotive products have become affiliated with the MEMA. Their names follow: Aircraft Specialties, Inc., Lapeer, Mich.; Anthes Force Oiler Co., Fort Madison, Iowa; Clifton Mfg. Co., Waco, Tex.; Crowe Name Plate & Mfg. Co., Economy Electric Lantern Co., Inc., Linendoll Corp., The Lubrication Corp., L. J. Miley Co., and Ryder Mfg. Co., Inc., all of Chicago, Ill.; The Drackett Products Co., Cincinnati, O.; Fowler-Pem Co., Emeryville, Cal.; Hawley Mfg. Co., Inc., Chester, Pa.; Homestead Valve Mfg. Co., Coraopolis, Pa.; Parts Mfg. Corp., Brooklyn, N. Y.; Steel Materials Corp., Detroit, Mich.; Sure-Rite Products Corp., Philadelphia, Pa.

Millard Fillmore College of the University of Buffalo, Buffalo, N. Y., is giving a course in rubber chemistry at night. Classes began last month for this new line of study at the university. The rubber course is presented by Dr. Howard W. Post, assistant professor of chemistry; John Plumb, Jr., of the U. S. Rubber Reclaiming Co.; Dr. William R. Sheridan, Dunlop Tire & Rubber Co.; and Michael Berman, Hewitt Rubber Co.



Harris & Ewing

Harrison E. Howe

Dr. H. E. Howe's Visit to Europe

A first-hand impression was obtained regarding the stress being placed on the synthetic, Buna, when Dr. H. E. Howe, editor of *Industrial and Engineering Chemistry*, attended the German exposition of Chemical Equipment, this summer. German manufacturers are evidently putting a great deal of pressure back of the work on their synthetic rubber-like material Buna and expect to replace with some rapidity much of the crude rubber now imported. This is only a part of the current plan in Germany to make the country as independent as possible of all foreign sources of raw material. At the Achema, the recent exposition of chemical equipment, Buna occupied a commanding position in the hall devoted to synthetic materials. It was shown in different grades, in considerable quantities, and several booths were devoted to displays indicating how universally Buna could be used in place of crude rubber for a wide variety of applications. Another part of the hall contained a display of devices used in testing to help prove the superior qualities of these synthetic materials, and there was a display as well of special books and literature on these subjects. Dr. Howe was informed that the Germans are said to be making about 20,000 tons annually at the present time, which is approximately one-third their requirements. While in Germany, Dr. Howe also visited the great Leunawerke of the I. G. Farbenindustrie at Leunawerke and was shown every possible courtesy by officials there.

Dr. Howe, who returned from abroad recently, made the trip as a mixture of pleasure and the business of attending the Rotary International in his capacity then (but not now) of Director of Rotary International. He spent a week in Switzerland and one in France, but only a few hours in Italy this time; crossed Austria into Czechoslovakia; spent several days in Germany; and had a brief look at Denmark, Holland, and Belgium; and then roamed around the British Isles, including Ireland. He took motion pictures of his trip and talked with many people in the different countries.

SAE Ordnance Rubber Unit

The Ordnance Advisory Committee of the Society of Automotive Engineers, 29 W. 39th St., New York, N. Y., cooperating with the United States Army at the request of the Chief of Ordnance, has organized a sub-committee on rubber products to advise on the development of ordnance rubber goods of non-commercial application and methods to secure the aid of the rubber industry in the program and also to advise on the adaptation of industrial rubber products to ordnance use. Heading the subcommittee is J. E. Hale, Firestone Tire & Rubber Co., with L. M. Kubaugh as alternate. On the subcommittee are K. D. Smith, B. F. Goodrich Co., with H. Schippel as alternate; G. K. Henshaw, Goodyear Tire & Rubber Co., with R. T. Brown as alternate; and Dr. S. M. Cadwell, United States Rubber Products, Inc., with E. Botts as alternate. Representing the United States Army on the subcommittee are Lt.-Col. B. O. Lewis with W. F. Beasley as alternate; Maj. J. K. Christmas with Capt. E. L. Cummings and H. W. Evans as alternates; Col. W. A. Capron with Dr. A. C. Hanson as alternate; and Maj. W. W. Warner. Heading the Ordnance Committee of the SAE are Chairman H. W. Alden and Col. G. F. Jenks, Ordnance Department, U. S. Army.

Vulcanized Rubber Co., Morrisville, Pa., is very busy and expects a good fall season.

Wishnick-Tumpeer, Inc., 295 Madison Ave., New York, N. Y., has announced that Albert A. Woll, recently graduated from Massachusetts Institute of Technology, has joined its technical staff.

Du Pont Exhibit at The Franklin Institute

On October 13, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., formally opened its exhibit, "Better Things for Better Living through Chemistry," at The Franklin Institute, Philadelphia, Pa. Features of the affair were addresses by Lammot du Pont, president of the company, and by Dr. C. M. A. Stine, du Pont vice president. Part of the program was included in the company's regular Wednesday night broadcast, "Cavalcade of America," (8:00 p.m. E. S. T. over a coast-to-coast Columbia Broadcasting System network.)

Mr. du Pont devoted about half of his address, "Chemistry and Cost," to chemical materials and rubber, with emphasis on tires, and Neoprene. Dr. Stine spoke on "The Social Implications of Scientific Research," citing the great gains made by chemical research to many fields including textiles (here mentioning "Cordura," rayon used in the fabric of heavy-duty bus and truck tires); automobiles; agriculture; building; air conditioning; dyestuffs; synthetic materials such as Neoprene; and medicine.

The exhibit, which will continue for the next few months, shows Neoprene products, rayon goods including "Cordura," dyestuffs, bleaching agents, water-repellent as well as crease-resistant finishes, "soapless soaps," flameproofing chemical, softeners, Cellophane goods, man-made sponge, coated fabrics as Cavaltex and Cavalite, used in making raincoats, sportswear, hospital sheeting, and similar waterproof articles, photographic film, finishes with a synthetic base, plastics, refrigerants, ammonia, explosives and blasting agents, plating materials, and an anti-rust anti-freeze.

American Welding Society, 33 W. 39th St., New York, N. Y., recently presented the Samuel Wylie Miller Medal, an annual award for meritorious contributions to the science and art of welding, to H. Sidney Smith, consulting engineer for Union Carbide Co., 30 E. 42nd St., New York.

Carl L. Reed, export manager of the Kelly-Springfield Tire Co., Cumberland, Md., recently returned from an eventful trip through the Orient, reported Sino-Japanese hostilities have slowed down business activity in China, but Hawaii and the Philippine Islands are enjoying great prosperity. Mr. Reed was in Shanghai at the time of the outbreak of trouble between Chinese and Japanese. Dodging a cholera epidemic in Hong Kong, he was scheduled to return on the *President Hoover,* which was bombed and did not stop at Shanghai. Mr. Reed and his party finally succeeded in securing passage on a Japanese ship to Nagasaki. There they took a train for a two-day trip to Yokohama in time to catch the *President Hoover.*

Jenkins & Guillo, Inc.

E. V. Osberg

Ed Osberg Made Assistant Editor

Edward V. Osberg, who recently became a member of the editorial staff, has now been appointed assistant editor of INDIA RUBBER WORLD. He received his education at Brewster Academy, Wolfeboro, N. H., and Brown University, Providence, R. I., where he majored in chemistry. He also took a special course in Colloidal Chemistry at Massachusetts Institute of Technology under the direction of Dr. Ernst A. Hauser.

In 1930 Mr. Osberg began his association with the Simplex Wire & Cable Co., Cambridge, Mass., where he served as assistant rubber research chemist and later as chemist in connection with the development and application of latex to the manufacture of insulated wire. In July, 1937, he resigned that position to take up his recent duties with INDIA RUBBER WORLD.

International Acetylene Association will hold its thirty-eighth annual convention at the Tutwiler Hotel, Birmingham, Ala., November 10, 11, and 12.

Manhattan Rubber Mfg. Division of Raybestos Manhattan, Inc., Birmingham, Ala., has announced that Chas. P. Shook, Jr., for two decades with the firm, has been made assistant manager. He will devote part of his time to development of new business.

Foster D. Snell, Inc., consulting chemist and chemical engineer, 305 Washington St., Brooklyn, N. Y., has announced that Esmond W. Gifford, A.B. and B.S., Union College, has joined its staff. Foster Dee Snell, head of the firm, addressed the St. Louis (October 4) and Kansas City (October 5) sections of the American Chemical Society on "Some Factors in Detergency" and on October 11 spoke before the Maryland Sales Representatives Association on "The Legal Chemistry of Foods."

Premium Show Included Many Rubber Products

The Third Annual Atlantic Coast Premium Buyers' Exposition was held at the Hotel Astor, New York, N. Y., September 27 to October 1 inclusive under the auspices of the Premium Advertising Association of America, Inc., New York. The entertaining program and interesting exhibits made for a successful affair. Among the rubber concerns that were present were the following:

The Barr Rubber Products Co., Sandusky, O., with a permanent showroom at 200 Fifth Ave., New York, introduced several novelties among which were the Nosey Mouse balloon with inflatable nose as well as inflatable ears; "Porky Pig" balloon tossup with feet; also gas inflated and sponge rubber balls; toy rubber automobiles; molded rubber novelties; etc. The booth was in charge of William J. Canary, eastern division manager for the company. Among those who greeted buyers and visitors were Arthur D. Benedict, vice president in charge of sales, Fred M. Sichel, R. A. Behrens, and M. A. Hennessy.

Eagle Pencil Co., 703 E. 13th St., New York, displayed pencils, fountain pens, penholders, etc. In charge was S. H. Engelberg.

Eberhard Faber Pencil Co., 37 Greenpoint Ave., Brooklyn, N. Y., featured pencils, penholders, rubber bands, and erasers. On hand were W. J. Crangle and N. L. Pearce.

The Pioneer Rubber Co., Willard, O., showed balloons with moving eyes, suction cups, and household and surgeon's gloves. Welcoming the trade were H. B. Burnstine, manager of the New York office at 200 Fifth Ave.; J. C. Gibson; and A. A. Burnstine.

Premium Specialists Co., 225 Fifth Ave., New York, had on view a wide variety of novelties including Snapon rubbers. Representing the company were E. M. Benson, Wm. and George Weltmer, and C. A. Schoemaker.

Myer Rosenberg, 323 S. Franklin St., Chicago, Ill., exhibited products of the Anderson Rubber Co., Akron, O., Auburn Rubber Co., Auburn, Ind., and the Sponge Rubber Products Co., Derby, Conn.

The Seamless Rubber Co., Inc., New Haven, Conn., presented gas inflated balls, bathing caps, rain capes, combs, and other small rubber articles. Company representatives in attendance were J. T. Gibbons, W. W. Wilkerson, Arthur Scrivenor, Jr., and C. B. Ryan.

Oscar R. Seitz, 175 Fifth Ave., New York, showed various items including household goods as rubber door mats. Present were Oscar R. and E. M. Seitz and James V. Finaldi.

A. L. Siegel Co., 395 Fourth Ave., New York, had on display a range of products including Pliofilm goods as rainwear and Clearview Coverets for fruits, vegetables, table cloth and napkins, and sheets. Representing the company were A. L. and H. Siegel, A. L. Sherwin, and Lee Aronson.

S. C. I. Medal Awards

The Chemical Industry Medal of the Society of Chemical Industry will be awarded this year to E. J. Crane, editor of *Chemical Abstracts,* at a joint meeting of the American Section of the Society of Chemical Industry and the American Chemical Society to be held at The Chemists' Club, 52 E. 41st St., New York, N. Y., November 5, with James G. Vail presiding. The medal, awarded annually for valuable application of chemical research to industry, will be presented to Mr. Crane for his work in abstracting technical and scientific writings in all fields of the chemical industry. A dinner in his honor will take place before the meeting.

Dr. Frank J. Tone will receive the Perkin Medal of the Society for 1938 at a meeting on January 7 at the Chemists' Club. The medal, awarded annually for valuable work in applied chemistry, will go to Dr. Tone for his efforts in developing abrasives and refractories. The selection was made by a committee representing the five chemical societies in the United States.

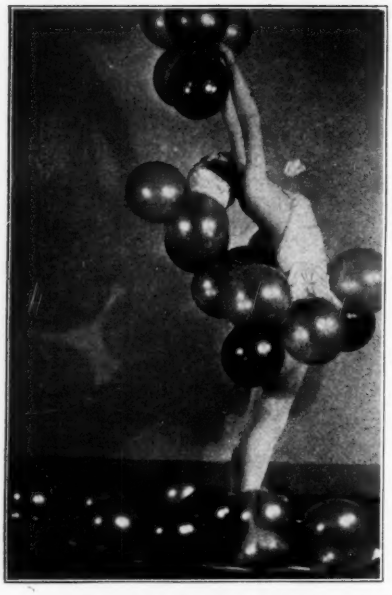
Tire Cord Specifications Revised

Committee D-13 on Textile Materials, American Society for Testing Materials, held a meeting from October 20 to 22 at New York, N. Y. At this meeting sub-committee A-1 made a complete revision of Standard Methods of Testing and Tolerances for Tire Cord, Woven and on Cones.

Office Equipment Uses Rubber

The application of rubber to a variety of machines and equipment designed for increasing office efficiency was noted at the Thirty-Fourth Annual Business Show which was held October 18 to 23 at the Port Authority Building, New York, N. Y. A new elastic telephone cord on exhibit allows for an elongation up to 100% over its normal length. This is made possible by an elastic core around which the conductors are braided.

The Hohwieler Rubber Co., Morrisville, Pa., which sold rubber quoits and a golf-driving outfit to the MacGregor Expedition now at Reindeer Point, North Pole, has just heard from the outfit through a radiogram received through an amateur station at Buffalo, N. Y. Colonel C. J. MacGregor, head of the expedition, sent the radio to the Hohwieler company, and it was picked up at Buffalo. The owner of the Buffalo station notified the rubber firm through a letter. The MacGregor expedition sailed from Newark on July 2 on the Schooner *A. W. Greeley.*



"The Lighted Balloon Girl"

Miss Beth Pitt in her act uses several large, inflated balloons attached to her person which give her buoyancy and permit her to rise to unusual heights in her dancing. She has been doing this work ten years, and her electrically illuminated balloon number is patented and copyrighted. Miss Pitt promises a new "water-walking" balloon number at the San Francisco World's Fair or the New York Exposition.

Sixteenth Exposition of Chemical Industries, to be held at the Grand Central Palace, New York, N. Y., December 6 to 11 (inclusive), 1937, has announced that already more than 250 exhibitors have engaged space. Three floors of the Palace will be occupied, and indications point to one of the most successful of such expositions ever held. Raw materials and chemical products, laboratory and plant equipment, and the machinery essential to manufacturing in all of the industries based on chemistry and chemical engineering will be shown. Also presented will be new research developments, many in the organic field. Judging has been completed on the hundreds of entries received in the slogan contest which closed September 18. The winning slogan is "Chemical Research Creates Industries," submitted by Norman E. Diehl, assistant purchasing agent, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Members of the Exposition Advisory Committee, of which Dr. M. C. Whitaker is chairman, were the judges. Presentation of the awards will be made at the exposition Monday evening, December 6, at 8:00 p.m.

United States Rubber Products, Inc., 1790 Broadway, New York, N. Y., realizing that there are still 1,413,800 miles of entirely unimproved and semi-improved dirt roads in the rural sections of the United States which are made more treacherous with winter weather, recommends its Nobby Traction Tire for such conditions where extra traction and pulling power are needed. The 1937 Nobby Traction Tire, with its improved "nobby" design and carcass structure, is said to provide all the features which have proved essential in a mud and snow tire: all-direction traction, automatic self-cleaning, more flexibility, extra pulling power, and longer life, both in tread wear and in combating exposure to the elements. Many farmers already know Nobby as an old friend, because the basic "nobby" design of this tire was developed by "U. S." a quarter of a century ago.

Acorn Insulated Wire Co., 225 King St., Brooklyn, N. Y., announced that on October 1, D. F. Clash joined its staff as factory manager. For the past three years he was employed in the Reseach Development Dept. of the Anaconda Wire & Cable Co., Pawtucket, R. I., plant.

OBITUARY

David Lewis

DAVID LEWIS, 58, of Trenton, N. J., vice president of the Bartley Crucibles & Refractories Co., and for 35 years engaged in the scrap rubber and metal business, died September 24 following a lengthy illness. He was long active in politics and was a member of the Trenton Lodge of Elks. He is survived by his wife and four sons. Burial was in Philadelphia, Pa.

T. W. France

THOMAS W. FRANCE, who for 33 years represented H. W. Butterworth & Sons Co., Philadelphia, Pa., in the New England territory, operating out of Providence, R. I., died suddenly September 26. Mr. France, who was of English parentage, had been identified with the textile industry practically all his life. During the past few years he had suffered several heart attacks similar to the one which resulted fatally. He is survived by his widow. He was buried on September 29.

Thomas Hydes

THOMAS HYDES, of Trenton, N. J., who died October 7, was formerly a rubber broker in New York, N. Y., and Trenton and was in business at the latter place for more than 30 years. He retired about 11 years ago. A native of England, where he was born 82 years ago, he came to this country in 1883. He was a thirty-second degree Mason and a member of the Scottish Rite and F. & A.M. lodges in Jersey City, N. J. He is survived by two sons. Burial was in Ewing Church Cemetery, Ewing, N. J.

OHIO

INDUSTRIAL sentiment is depressed in Ohio. New orders have been received in less than anticipated volume, and a waiting attitude is widely evident. Machine tool plants attribute their recent good showing to buying from foreign sources as far as orders were concerned, for domestic demand has slackened. Factory output, though, remains at a good rate on orders previously placed, and deliveries are still delayed.

But for the rubber industry a bright future is pictured. One report expresses the belief that profits for the rest of 1937 should be well above those for the corresponding period last year. Original tire equipment sales, it is figured, should show a gain of 10 to 15% in the third quarter because of increased car and truck production. Replacement sales, however, are due to lag although one authority disagreed, declaring that the replacement branch of the industry also is prospering.

Goodyear News

The appeal of The Goodyear Tire & Rubber Co., Inc., Akron, against the decision of the Federal Trade Commission in the matter of the case involving the tire manufacturing contract with Sears, Roebuck & Co., Chicago, Ill., has been submitted to the United States Circuit Court of Appeals in Cincinnati. Goodyear seeks to have the District Court reverse the decision of the commission, which issued a cease-and-desist order against it in connection with this case.

Since passage of the Robinson-Patman bill Goodyear has terminated all contractual relations with Sears, Roebuck, and the cease-and-desist order, of course, has no meaning in view of the fact that the amended law covers the situation which Goodyear council maintains was not covered in Section 2 of the Clayton Act upon which the Federal Trade Commission bases its cease-and-desist order. Therefore the *status quo* of the case is "submitted to the court on its merits," and the next move, of course, will be from the court when its decision is handed down.

The Goodyear factory in Granville, Australia, on October 12 celebrated its tenth anniversary. Construction of the factory started in February, 1927, and the first tire rolled out of the molds in October. Since that opening day more than three and three-quarter million tires have been manufactured for consumption in Australia. Four times (during 1928 and 1929) additions have been made, each almost before the previous one was completed, making the present factory four times as large as the original 1927 unit. Incidentally, the Goodyear plant at Wolverhampton, England, will celebrate its tenth anniversary next month.

Finishing a successful season at Great Lakes Exposition in Cleveland, Goodyear airships *Puritan* and *Reliance* were again scheduled to spend the Winter in Florida. (*Puritan* at Miami, *Reliance* at St. Petersburg). *Reliance* left Cleveland early in September, went to Dallas, where it operated until the close of the Pan-American Exposition there on October 31. Stationed at Washington, D. C., is the airship *Enterprise;* at Los Angeles is the airship *Volunteer.*

Two hundred Goodyear employes from September 30 to October 3 enjoyed their annual excursion—this time to New York, N. Y., which many of them had never seen before. Highlights of the trip were a four-hour bus ride covering the most interesting points in the city, then theaters or night clubs, visits to Battery Park and the Aquarium, and a steamer ride around Manhattan Island where more interesting places were indicated.

Inter-Plant Conference

Since the Goodyear Tire and Rubber Co. operates 11 tire plants in this country and abroad, five cotton mills, cotton and rubber plantations, there is a constant exchange of production, development, and technical information between the home office in Akron and the outside plants.

From the time Goodyear opened its first outside factory in Canada in 1913 a department has been maintained in Akron as a clearing house for all inquiries and the transmission of production and technical information. Each plant has a man in this interplant department in Akron who is virtually its representative at the home office. Once each year the principal executives from the outside plants come into Akron for a week of study and interchange of information and ideas.

This year's conference started September 27 and brought more than 50 men into Akron for a four-day discussion of every phase of rubber manufacture. A feature of the conference was an inspection visit to the company's newest plant at Jackson, Mich., said to be the most modern in the world. The conference wound up September 30 with talks by President P. W. Litchfield; C. C. Slusser, vice president in charge of manufacture; R. S. Wilson, vice president in charge of sales; and A. G. Cameron, vice president of the export company.

Rio to New York by Car

Three Brazilians recently completed the first all overland passage from Rio de Janeiro to New York, via Buenos Aires by automobile. Desiring to pioneer a trail that ultimately would link the nations of South, Central, and North America more closely together, they set forth in two new Model-T Ford cars from Rio on April 16, 1928. In command was ex-army officer Leonidas Borges de Oliveira; observer was ex-navy officer Francisco Lopez de la Cruz; mechanic, Mario Fava. All three departed with scientific qualifications acquired in Brazil's College of Military Engineers; vowed to chart, actually traverse, every foot of the most practical, feasible route for a motor road to New York.

Arrived at New York, 16,182 miles had been left behind, approximately 3,000 miles of which never before had been traveled by wheeled vehicle, even by nomadic pedestrian. Every mile covered was carefully mapped, charted meticulously to serve as a survey for highways of the future.

Their cars used 52 Goodyear tires and four of other makes, a total of 56 tires and three times as many tubes, as several thousand miles of the distance was over ox-cart trails and temporary roads cut out of the forests and mountains by the expeditionaires themselves with the aid of natives.

Goodrich Notes

Formal presentation of the J. D. Tew accident prevention trophy to the tire division of The B. F. Goodrich Co., Akron, was made recently at a divisional safety rally. The trophy, six months' possession of which was won by the tire division for its showing in safety work during first half of 1937, was presented by L. L. Smith, assistant Goodrich treasurer. It was received for the division by E. H. Barder, tire division general superintendent.

First term classes of the Goodrich University of Akron Institute, marking the start of the institute's fourth year of operation opened September 27. Courses cover a wide range of studies.

Forty members of the company's Nukraft department, with their families and friends, recently held their first annual picnic.

George Stritch, manager of the Detroit manufacturers' sales division office of the Goodrich company, recently completed two decades of service with the company and was presented his 20-year service pin. He is now eligible for membership in the Goodrich Twenty-Year Service Club, which has an enrollment of more than 1,700. Mr. Stritch has represented his company in Detroit 17 years, after serving three years on the staff at Akron.

Tire Cord Figures

More than 18,000,000 miles of tire cord, enough to stretch 730 times around the earth at the equator, were produced last year by Martha Mills, Silvertown, Ga., Goodrich's textile division. Approximately 80,000 bales, or 40,000,000 pounds of American-grown cotton are annually converted into cord by the Goodrich mills for use in manufacturing tires and other products. Goodrich annually consumes about

125,000 bales of cotton in its various manufacturing operations in the United States.

New Tractor Tire

A new tractor tire, designed particularly for use in rice and sugar cane fields, was recently announced by Goodrich. This tire was engineered to give maximum traction in soft muddy fields and has a tread of cleats 2½ inches high. The "Hi-Cleat tire" is also said to give smooth riding and resistance to wear on hard surfaces.

Rubber Vibro-Insulators

Increased power and efficiency for many types of machines, elimination of distracting noise and vibration, and decreased physical and nervous strain on employes are forecast on an increasing scale for industry, following a survey of results of several installations of newly developed rubber vibro-insulators.

According to Samuel B. Robertson, president of the Goodrich company, whose engineers developed the rubber mountings, application of vibro-insulators ranges from protection of instruments as delicate as the temperature-recording pyrometer to quieting the pounding of a heavy-duty 80-ton rubber masticator.

A large St. Louis manufacturing plant uses vibro-insulators to protect instruments on a temperature-control panel board, near several forging machines and traveling cranes. According to company engineers, the pounding of the heavy machines threatened to destroy the pyrometers until the rubber mountings were installed.

The survey further revealed a typical installation of vibro-insulators, in the Brooklyn plant of a window-display equipment manufacturer, where rubber mountings were used to overcome the shaking of a floor by a fan motor, so pronounced that it resulted in illness to employes in the immediate vicinity and caused considerable loss through breakage of mannikins. There has been no loss of time due to illness caused by vibration since the rubber mountings were installed, the manager of the plant reported, and no monetary loss due to breakage of mannikins.

The 80-ton masticator, tamed with vibro-insulators, is in the main Goodrich plant at Akron, Mr. Robertson said, where the installation of rubber mountings ended the danger that vibration would open a crack in the building.

Rubber Workers Heedless of Contract

On April 1 The Bowling Green Rubber Co., Toledo, negotiated a contract with Local 26 of the United Rubber Workers of America. The committee voluntarily stated, "You have been more than fair." This contract was to run six months and then be automatically renewed for another six months with the provision, however, that either party could notify the other of a termination 30 days previous to the first six months' expiration. The contract also had a provision stating that there would be no stoppage of work because of complaint until, first, the usual grievance procedure had been gone through with; second, International union officers had been called in; third, mediators were to be called in.

On September 14, only 16 days before termination, the Local gave written notice that it would like to discuss several changes in the contract and also requested a 10¢ an hour increase. No difficulty seemed to arise on the proposed changes. On the rate increase, the union was informed an increase was now impossible, particularly as two increases had been made during the last 12 months. On October 1 the men staged a slow-down strike and on the afternoon of October 4 a sit down.

In a recent statement the rubber company said: "We have attempted to have the matter handled by the Toledo Peace Board, but the men are putting every obstacle in the way of this. We requested that a panel of three Peace Board members be appointed to determine whether we could substantiate that it was inadvisable on our part to grant an increase at the present time. This the union countered with a proposal that they put a Certified Public Accountant on our books and report to them. We are ready to have the matter taken up before mediators, but the union is apparently determined to prevent this procedure."

Harvey Firestone, Jr., accompanied by eight other officials of the Firestone Tire & Rubber Co., Akron, last month sailed on the *Roma* on their way to Liberia for an annual inspection of the company's rubber plantations there.

Frank A. Seiberling, president of the Seiberling Rubber Co., Akron, on October 6 celebrated his seventy-eighth birthday by being at his desk as usual. He is reported to have said, however, that he plans to retire at the end of the year. On October 12, the veteran industrialist and his wife celebrated their golden wedding anniversary with a large party planned by their children and attended by many men prominent in the rubber industry. One of the gifts to the feted couple was a two-volume book prepared by members of the family, showing in words and pictures the 50 years of their married life.

The Ohio Rubber Co., Willoughby, manufacturer of automotive, molded, and extruded rubber products, according to President Franklin G. Smith is erecting a three-story steel, brick, and concrete plant addition that will provide about 14,000 square feet for storage of materials in process and some crude stock. The company plans also to build a steel and brick warehouse with concrete floor, having about 7,000 square feet of space.

General Tire & Rubber Co., Akron, according to President W. O'Neil, recently contracted for life insurance protection for more than 500 employes of its mechanical goods division. Besides the $1,000 policy which the company will provide free for each worker, it has offered all employes a chance to take out additional insurance on a cooperative basis, the company paying part of the cost of each policy in excess of $1,000 and the employe paying the rest, announced H. M. Dodge, general manager of the Wabash plant. The new policies, for which employes were not required to take examinations, became effective last month.

General tires helped C. O. Perkins, of Santiago, Chile, in making a recent motor trip across Colombia, South America, when it took him 30 days to travel 3,380 kilometers in the first car ever to make the complete trip from Ecuador to Venezuela. Mr. Perkins had to travel through a town which a nearby volcano shakes every 20 minutes, under several waterfalls, through sudden changes of temperature from tropical heat to cold, through unfriendly territory and foodless and waterless places, over one-way roads directed by control stations, and over roads constructed of materials such as plain dirt, decomposed granite, and flint-like lava.

Aetna Rubber Co., Cleveland, has announced that S. T. Campbell, who resigned several months ago from the company presidency, on September 30 retired also from the board of directors.

U. S. Imports of Rubber Products

Imports of rubber balls into the United States during August show remarkable reductions. Golf ball imports for consumption from United Kingdom were valued at $3,222 of the total imports of $3,233 as against $14,267 of a total of $14,312 in June; while tennis ball imports in August were valued at $35 of a total of $38, contrasted with a value of $6,471 of the total $6,915 in March. Japan sent other rubber balls valued at $3,002 of the August total of $3,220, compared with $23,557 of the total $23,637 in March.

In many lines of rubber products Japan occupies a predominant position in exporting to the United States as shown by the following figures for August recently issued by the Department of Commerce. Rubber toys from Germany were valued at $1,282 and those from Japan at $7,604 of the August total of $9,023. August imports of water bottles and fountain syringes were valued at $3,237, all from Japan. The total value of rubber belting imported in August was $34,465, with United Kingdom supplying $11,164 worth and Japan $23,285. All the rubber erasers imported in August came from Japan, valued at $720, and she also supplied $284 worth of rubber bands of the total $378 worth that month.

MIDWEST

WHILE a lull has prevailed in trade and industry in some sections of the Midwest, the general average is said to be above last year's figure. An early pick-up is expected. Chemical plants are about the only ones which have not reported curtailment. Zinc and lead production is satisfactory. Carloadings are running close to 12% over last year's figures, mainly because of heavy grain and coal shipments. Living costs are becoming an increasingly serious factor to the wage earner, and economies in food buying and other lines are being felt. Farmers' incomes have also declined with the drop in grain markets.

Production of steel ingots toward the end of October in the Chicago district was said to have fallen to 42.9% of capacity. A further report set the national rate at 55.8%, showing a loss also.

Automobile production continued to rise last month in preparation for new models exhibitions, but the gain was less than computed for seasonally. Retail showroom reports indicate less interest than last year in new models. This condition is attributed to higher prices, fear of further business reaction, and the impression that the best of the buying market has been seen in the last two years.

The American Petroleum Industries Committee predicted, however, that every third family of the 30,000,000 in the United States will purchase an automobile, new or used, some time during 1937. Sales of new cars this year are expected to reach 4,300,000, and sales of used automobiles, which for the last decade have greatly exceeded those of new units, are expected to exceed 7,000,000, making a total of approximately 11,500,000 auto sales transactions. Last year 10,606,000 automobiles were sold in this country; 4,016,000 were new cars, and 6,590,000 were used ones.

Monsanto Chemical Co., St. Louis, Mo., according to an announcement of the Committee of Award has won the 1937 "Award for Chemical Engineering Achievement." This award was instituted by *Chemical & Metallurgical Engineering* in 1933 to stimulate a broader participation of chemical engineers in the affairs of industry and to honor every two years that company which has contributed most to the advance of the chemical industry and of the chemical engineering profession. In making the 1937 award, consideration was given primarily to the successful design, construction, and operation of the new phosphorus producing plant built by Monsanto this year at Monsanto, Tenn. The committee stated it also took into consideration the entire history of Monsanto's program of chemical engineering, research, and development.

The "Chemical & Metallurgical Engineering" award was given in 1935 to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., for the development of its synthetic rubber and camphor compounds. The first award, in 1933, went to Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York, N. Y., for the development of an organic chemical industry based on natural gas and petroleum.

Tire Dealers Protest $1,000,000 Government Award

Before closing its three-day convention at Chicago, Ill., on October 20 the National Association of Independent Tire Dealers, Inc., passed the following resolution:

"In view of the violation of a government statute by the procurement division of the Treasury Department in awarding a contract for $1,000,000 of tires to a mail-order house, resolved that the government department violating the statute declare the contract null and void."

N. S. C. Congress

National Safety Council, 20 N. Wacker Dr., Chicago, Ill., held its twenty-sixth national safety congress and exposition at Kansas City, Mo., October 11 to 15. On October 13 D. D. Fennell, consulting engineer of Chicago, Ill., was elected president of the safety society.

Rubber Section Officers

During the course of the annual convention the Rubber Section of the National Safety Council held its election of officers for 1937-1938 with the following results: Executive Committee: general chairman, J. M. Kerrigan, U. S. Rubber Reclaiming Co., Inc., Buffalo, N. Y.; secretary, R. W. Morse, Firestone Tire & Rubber Co., Akron, O.; News Letter editor, Oliver Hopkins, United States Rubber Products, Inc., Providence, R. I.; engineering committee chairman, J. G. Polm, Goodyear Tire & Rubber Co., Akron; health committee co-chairmen, Dr. W. S. Ash, U. S. Rubber Products, Detroit, Mich., and Dr. J. Newton Shirley, Arrow Mutual Liability Insurance Co., Watertown, Mass.; membership committee chairman, Paul Van Cleef, Van Cleef Bros., Chicago, Ill.; program committee chairman, R. A. Bullock, Corduroy Rubber Co., Grand Rapids, Mich.; publicity committee chairman, W. H. MacKay, Dunlop Tire & Rubber Corp., Buffalo, N. Y.; statistics committee chairman, D. G. Welch, Hewitt Rubber Corp., Buffalo; Members at Large: E. W. Beck, U. S. Rubber Products, New York, N. Y.; A. M. Dietz, Pennsylvania Rubber Co., Jeannette, Pa.; R. S. Farnum, U. S. Rubber Products, Detroit; John L. Grider, American Hard Rubber Co., Butler, N. J.; C. F. Horan, Hood Rubber Co., Watertown; J. T. Kidney, Goodyear Tire; John J. Loge, General Tire & Rubber Co., Akron; John E. Lovas, U. S. Rubber Products, Passaic, N. J.; H. W. Low, Miller Rubber Products Co., Inc., Akron; Urban L. Moler, Inland Div., General Motors Corp., Dayton, O.; W. P. Spanton, American Hard Rubber, Akron; W. L. Schneider, B. F. Goodrich Co., Akron; Charles F. Smith, U. S. Rubber Reclaiming; C. W. Ufford, Ohio Rubber Co., Willoughby, O.

Safety Contest Winners

Winners of the 1937 Rubber Section Safety Contest were announced October 14. Bronze trophies were given first place winners and certificates for second and third honors.

Winners in Groups A and B, representing 125,001 or more average monthly man-hour exposure, were: (1) United States Rubber Products, Inc., Naugatuck Footwear plant, Naugatuck, Conn.; (2) United States Rubber Products, Ball Band Plant, Mishawaka, Ind.; (3) Dominion Rubber Co., Ltd., Merchants Factory, Kitchener, Ont.

There were four plants in Groups C and D with perfect records. These tied for first place: Van Cleef Brothers, Chicago, Ill.; Providence Insulated Wire Co., Pawtucket, R. I.; Lobl Mfg. Co., Middleboro, Mass.; United States Rubber Products, Fabric Fire Hose Co., Sandy Hook, Conn.

Thirty-seven participating plants, employing 67,874 men, worked 63,696,394 man-hours during the six-month period of competition and experienced 642 disabling injuries for an accident frequency rate of 10.079 disabling injuries per 1,000,000 man-hours. Both the accident frequency rate and man-hours of exposure were higher than for all previous contests.

Plants averaging 125,001 or more man-hours per month, composing Groups A and B, made the best records in the contest with an average frequency rate of 10.05. Seven of the 22 plants in Groups A and B had frequency rates below 2.00 for the contest period.

Groups C and D, plants with 125,000 or less man-hours of exposure per month, had an average frequency rate of 10.424. Two-thirds of the plants in both divisions had frequency rates below the averages.

Where two or more contestants tied for first place in any group without a disabling injury, these perfect records resulted in equal rankings and awards. A disabling injury was defined by contest rules as an injury arising out of and in the course of employment, resulting in death, permanent total dis-

(*Continued on page* 68)

PACIFIC COAST

Goodyear Tire & Rubber Co. The National Labor Relations Board announced on October 10 that it has certified the United Rubber Workers of America, Local 131, as the representative for collective bargaining of the production and maintenance employes of the Los Angeles plant of the Goodyear Tire & Rubber Co. An election held on September 10 resulted in 801 out of 1,473 votes being cast for the U. R. W. and 656 for the Goodyear Employes Association, Inc.

U. S. Tire Dealers Meet

U. S. Tire Dealers Mutual Corp., 1790 Broadway, New York, N. Y., held the third meeting of its Dealer Advisory Council in Los Angeles, Calif., September 27 and 28, at which highway safety facts were discussed as well as means of better serving the motoring public. One of the recommendations made was that the unlimited road hazard guaranty was unsound to producer, dealer, and consumer—and that the proposed amplification of the standard warranty be unanimously adopted and recommended by the council.

Unique in tire merchandising history, this council, begun last January, brought to the Pacific Coast for the first time a group of important U. S. tire dealers from various parts of the country to discuss matters of mutual interest and public benefit. Members of the Council, C. L. Dorman, San Diego, Calif.; J. H. Wright, Little Rock, Ark.; Milton Rosen, St. Paul, Minn.; Joseph H. Walsh, Jacksonville, Fla.; and Edward H. Cummings, Portland, Oreg., met with officials of the U. S. Tire Dealers Mutual Corp.: L. D. Tompkins, vice president; H. N. Hawkes, general sales manager; J. B. Brady, general manager for the company on the Pacific Coast; H. A. Farr, assistant general sales manager; R. C. Tucker, Pacific Division tire sales manager; R. W. Collings and F. M. Stewart, of the general office staff; and divisional managers C. N. Baker, C. W. Ort, and T. Berry; and district managers L. E. Kaford and J. D. Ferris. Approximately forty U. S. dealers representing the entire Pacific Coast Region also attended.

On their return trip company representatives stopped over in key cities and discussed with representative local dealers the recommendations adopted at this meeting.

John Griffin, formerly assistant to the district manager at Kansas City, was appointed district manager of the Omaha branch, by U. S. Tire Dealers Mutual Corp.

P. C. Anderson, formerly a special representative, Chicago branch, was named district manager of the Milwaukee branch, succeeding R. C. Moore, assigned to other duties in the Detroit division.

Woody Hockaday, U. S. tire dealer in Wichita, Kan., offered a set of U. S. Royal Master tires to the player hitting the first home run of the World Series engaged in last month in New York by the Yankees and Giants. The tires were won by "Tony" Lazzeri, second baseman of the American League team, when he hit a homer in the eighth inning of the first game.

FINANCIAL[1]

Unless otherwise stated, the results of operations of the following companies are after deductions for operating expenses, normal federal income taxes, depreciation, and other charges, but before provision for federal surtax on undistributed earnings. Most of the figures are subject to final adjustments.

Baldwin Rubber Co., Pontiac, Mich. Seven months to July 31: net profit, $365,275, equal to $1.31 a share on 278,604 shares of $1-par common stock, excluding treasury shares.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. First nine months of 1937: consolidated net earnings, $62,799,523, including $22,002,195 received from its investment in common stock of the General Motors Corp., equal after provision for dividends on the debenture and preferred stocks to $5.38 a share on the common stock, compared to $5.31 a share earned in the same period of 1936. Federal, state, and local taxes paid by du Pont and its subsidiaries amounted to about $16,600,000 for the nine months; while du Pont dividends payable to about 76,500 stockholders were declared in the amount of $52,506,000.

Harrisons & Crosfield, Ltd., London, England. Year to June 30: net income, £329,014, compared with net of £271,642 in the preceding year.

Hewitt Rubber Corp., Buffalo, N. Y. Nine months ended September 30: earnings, $260,968, equal to $1.55 a share on 168,188 outstanding common shares. Earnings in the comparable period of 1936 were $1.24 a share on present capitalization. September quarter: Earnings equivalent to 36¢ a share, against 47¢ a share in the same quarter of last year.

Martin Custom Made Tires Corp., 645 11th Ave., New York, N. Y. Nine months to September 30: balance before depreciation, taxes, etc., $44,064, against balance of $28,331 a year earlier. Sales increased to $686,955 in the nine-month period of this year from $517,649 last year.

Thermoid Co., Trenton, N. J. Nine months to September 30: consolidated net profit, $361,514. After preferred dividends of $90,528 there remained available for the common stock $270,986, equal to 57¢ each on 469,823 common shares. This compares with net in the 1936 period of $195,949, which, after preferred dividend requirements of $159,689 on previous capitalization, left a balance of $36,260, or 7¢ a common share. September quarter: consolidated net profit, $111,195; balance available for the common stock after preferred payments of $29,885 was $81,310, equal to 17¢ a share on 469,823 common shares. In the September quarter of 1936 the balance available for common stock was $2,029, or less than 1¢ a share on the above common shares.

[1] Dividends Declared on page 90.

Carlton Groat

Use Rubber Instead of Chains

Instead of using chains in winter weather Manfred Johnson, of Peach, Wash., cuts old tires to simulate chains and clamps them over his automobile tires. This rubber device can be left on all winter and doesn't wear out the tires as do metal chains.

New Incorporations

The Elastic Knitted Wire Co., Rhode Island. Capital 600 shares common stock. S. Nathanson, Central Falls; C. M. Nanni, Johnson; and H. M. Newell, Pawtucket, all in R. I. Manufacture wire and wire products.

William H. Fisler Co., 828 Market St., Camden, N. J. Capital 1,000 shares, no par value. W. H. and L. E. Fisler, both of 11 Ogden St., Collingswood, and W. E. Cassedy, 2734 Garfield St., Camden, all in N. J. Manufacture all kinds of mechanical rubber goods.

Flexline Products, Inc., 965 Hill St., North Bergen, N. J. Capital 100 shares, no par value. E. M. and S. M. Fischer, both of 965 Hill St., North Bergen, N. J., and M. Rosenblum, 217 Broadway, New York, N. Y. Manufacture various kinds of rubber.

NEW ENGLAND

IN NEW ENGLAND the trend toward contraction in industrial operations holds. It is believed that the weakness in stocks is a major factor in accentuating the general attitude of caution. The demand for cotton textiles has improved; while shoe business is fair. Metal and machine plants are slowing down, and there is no improvement in new building. In general, recent operations in the heavy industries do not reach the level of a year ago.

Levi C. Wade, 79 Bennett St., West Lynn, Mass., who supplies molds for rubber goods including heels and soles and designs and builds to order machinery of all kinds, is celebrating his thirtieth anniversary in the mold business, for he began making molds for rubber goods in 1907. He originally started in the machine business in 1904 building gasoline motors. Mr. Wade further announces that besides making molds for United States concerns he does a considerable export business, having customers in South America, Canada, England, and various European countries.

The Providence Fire Department, Providence, R. I., which heretofore has largely used 2½-inch hose is trying out seven kinds of 1½-inch hose upon the recommendation of Chief Thomas H. Cotter and adopted by the Board of Contract and Supply. Chief Cotter believes that the smaller hose is better adapted to the type of fires experienced in Providence. The board awarded 1,000 feet to the Eureka Fire Hose Division of the United States Rubber Products, Inc., 1790 Broadway, New York, N. Y., and 500 feet to each of the following: American Fire Equipment Co. of Boston, Mass., Bi-Lateral Fire Hose Co., 15 Park Row, New York, the Fabric Fire Hose Co., Sandy Hook, Conn., the Maxim Motor Co., Middleboro, Mass., and the Combination Ladder Co., and H. M. Howe Co., both of Providence.

Estate of Charles J. Davol. An inventory totaling $2,497,297.43, which includes 810 shares in the Davol Rubber Co., Providence, R. I., for the estate of Charles J. Davol, late head of the company, who died some months ago, has been accepted in the Probate Court at North Kingston, R. I. The stock for the rubber company is listed at a total valuation of $1,620,000, being rated at $2,000 a share. Stocks and bonds comprise a large part of the estate. Another large item is a certificate of deposit from Phenix National Bank of Providence for $300,000 dated September 29, 1933. Two mortgages are listed as are eight automobiles and deposits in four banks. The Davol yacht *Paragon*, for sale some time ago, is not listed.

W. F. Tuley

Research Chemist

Prominent among the chemists of the rubber industry is William F. Tuley, in charge of rubber chemical research and sales service at the Naugatuck Chemical Division of United States Rubber Poducts, Inc., Naugutuck, Conn. He is a native of Palmyra, Mo., where he was born July 7, 1899. Dr. Tuley attended Oregon State College, from which he was graduated in 1922 with a B.S. in chemical engineering. He received his Ph.D. in 1926 from the University of Illinois, where he majored in organic chemistry.

Next he was employed in the Chicago, Ill., research laboratories of The Celotex Co., manufacturer of fiber building board from sugar cane. Then in October, 1928, Dr. Tuley joined the staff of U. S. Rubber's General Laboratories at Passaic, N. J., working on chemical research and rubber compounding. He was transferred to his present post in 1934.

This chemist belongs to Sigma Xi, Phi Lambda Upsilon, Phi Kappa Tau, and the American Chemical Society. He is quite active in the affairs of the New York Group of the Rubber Division and also served on its executive committee during 1934-1935. Besides Dr. Tuley has presented several papers of interest to the rubber industry. His hobbies are golf and gardening.

The father of a son and a daughter, he resides with his family at 56 Park Ave., Naugatuck.

Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass., with the starting of the Estes gasoline plant near Wickett, Tex., last month practically completed the $6,000,000 expansion program undertaken by the company and its subsidiaries this year. This program has included construction of new carbon black factories at Wickett and Kermit, Tex.; the expansion of the Armstrong carbon black factory near Stinnett, Tex.; the construction of gasoline plants in the Estes and Keystone oil pools of West Texas; the construction of a pipe line from northern Pennsylvania to Rochester, N. Y., with numerous branch lines; the construction of a pipe line to Hinton, W. Va., with gas-distribution plant there; the construction of a main line from Kanawha County, W. Va., to the Little Kanawha River; and the drilling of numerous new wells for gas and oil.

The Whitney Blake Co., manufacturer of rubber insulated wires and cables, etc., recently reequipped its laboratory at New Haven, Conn., for rubber research. In charge, as chief chemist, is James E. Flood, with the company since August, 1937, after having been with General Electric Co., Bridgeport, Conn., since 1931. He is a graduate of Pratt Institute in Industrial Chemical Engineering 1931. Assistant to Mr. Flood is Arthur E. Thomas, who received a B.S. degree in Chemistry and Mathematics from Hobart College in 1933.

H. W. Butterworth & Sons, machinery manufacturer, Philadelphia, Pa., has appointed Frederick N. Spoerl to the New England territory, taking the place of Thomas W. France, who died September 26. Mr. Spoerl has been with Butterworth 25 years, mostly in the engineering department. He is a member of the American Textile Chemists & Colorists Association and the Masons. During the World War he was a noncommissioned officer and is now a major, Signal Reserve, being attached to the meteorological division.

Firestone Tire & Rubber Co., Akron, O., recently purchased a portion of the plant of the American Printing Co., Fall River, Mass., for the purpose of establishing a factory for the manufacture of rubber latex products. The Firestone Rubber & Latex Products Co. is now being organized to operate this new plant which will manufacture sponge rubber cushions for buses, sleeping cars, and furniture upholstery as well as numerous other latex articles as rubber thread, battery separators, tubing, adhesives, etc. The purchase of the Fall River property includes a water frontage of 4,000 feet with complete dock and wharfage accommodations on Mt. Hope Bay, a tidewater basin. This gives the company very advantageous facilities for receiving latex, now being produced on the Firestone Liberian plantations, as it can be shipped direct to the Fall River plant. The Firestone plantations are producing increasing quantities of rubber.

NEW JERSEY

SOME New Jersey rubber manufacturers found business declined the past month. Certain factories had to lay off help. Other concerns are operating at normal capacity.

Most local rubber manufacturers had elaborate displays at the recent New Jersey State Fair at Trenton.

The Okonite Co., Passaic, was awarded a contract by the United States Navy on its bid of $116,805 for electric cable.

The Mercer Rubber Co., Hamilton Square, reported business declined last month. William H. Sayen, company executive, recently returned from a business trip through the Midwest.

Lawrence M. Oakley, of the Essex Rubber Co., Trenton, was on a business trip through western Pennsylvania.

Kaysam Laboratory Moves to New Jersey

The Kaysam Corp. of America, One E. 57th St., New York, N. Y., is now moving its complete research and development laboratories from North Quincy, Mass. to 39-41 Brook Ave., Passaic, N. J. It is expected that normal operations will be resumed by the middle of November.

Allan A. Ryan, president of the Kaysam Corp. of America, has announced the election on October 21 of D. C. McRoberts to membership on the board of directors of that corporation.

Company Head

Like the rise of a Horatio Alger hero reads the life of William McCollum, for he landed in America in November, 1902, with $5 and now is president and treasurer of the Tingley-Reliance Rubber Corp., Rahway, N. J. He was born in County Antrim, Ireland, June 29, 1885, and later attended Ballynagashel National School.

His first job in the New World was hand trucking for the Arbuckle Coffee Co., Brooklyn, N. Y. Then in April, 1903, he secured employment as a gardener in Tuckahoe, N. Y. In the Fall of 1903, however, Mr. McCollum turned to Pittsburgh, Pa., and held several positions there, but the next year he went to Northampton, Mass., to become collector and salesman for the C. N. Fitts Furniture Co., whose best-known customer was the late Calvin Coolidge. In 1905 Mr. McCollum studied for two terms at the Mt. Herman Boys School and the following year attended Greenfield High School. In 1906 he went to Rahway as a salesman for the Tingley company. He was elevated to the presidency in 1922.

He belongs to the Masons. He likes to fish and hunt, especially to shoot grouse in Scotland.

Wm. McCollum

Mr. McCollum is married and the father of two sons. He lives at 1534 St. George Ave., Rahway.

Crescent Insulated Wire & Cable Co., Trenton, has let a contract for a two-story plant addition to cost $32,000. The company is very busy with orders for western firms.

Puritan Rubber Co., Trenton, stated business is slowing up after a busy season.

Acme Rubber Mfg. Co., Trenton, announced that business has shown an increase over the fall months of 1936.

Bruce Bedford, president of the Luzerne Rubber Co., Trenton, has been elected chairman of the special gifts committee of the Trenton Community Chest Drive.

Raybestos-Manhattan, Inc., Passaic, recently won a contract from the United States Navy to supply packing, at its bid of $12,466.

The Manhattan Rubber Mfg. Division of Raybestos-Manhattan recently received honorable mention for its industrial trade paper advertising at the annual convention of the National Industrial Advertisers Association in Chicago. In making their decision the judges followed a carefully worked out rating system whereby each phase of an advertising campaign, from objective to results, was considered. On this basis Manhattan's advertising was the unanimous second choice of the judges because of the integration of their campaign to accomplish Manhattan's advertising purpose.

N. S. C. Congress

(*Continued from page 65*)

ability, permanent partial disability, or temporary disability. Under the rules, "injuries" were classed as those accidents in which the victim was unable to return to work at the beginning of the next day following the mishap.

The half-year Rubber Section Safety Contest was sponsored by the National Safety Council.

SOUTH AMERICA

Uruguay

A Uruguayan decree in the Montevideo press of September 7, 1937, postponed for two months, or until October 3, the removal of certain sizes of tires for trucks, tractors, trailers, and busses from the list of tires permitted duty-free entry, as provided for by a decree of August 3, 1937, according to a report dated September 8, from Consul Augustin W. Ferrin, Montevideo. This measure was passed at the request of tire importers.

Accordingly, the full rate of duty of 41% plus surtaxes of 21% of the fixed official customs valuation of 2 pesos per kilo, plus the special highway tax of 0.10 peso per kilo, on extra reenforced and high-pressure tires, size 30 by 5, 32 by 6, 36 by 6, 34 by 7, 38 by 7, and 36 by 8, and on balloon-type tires, size 7.5 by 20 and 8.25 by 20, became effective October 3, instead of on August 3.

The decree further provided that imports of these tires during the two months' extension of the duty-free period must not surpass imports during the same period of 1936, and the Bureau of Industries and the Bureau of Customs were charged with the control of this provision.

Argentina

A recent government report estimates crude rubber imports into Argentina for the first nine months of 1937 at 13,742,060 pounds, against 7,213,470 pounds imported during the same period in 1936. It is believed this increase is due to heavy production activities of local tire factories.

Amazon Rubber Exports Up

Exports of crude rubber from the Amazon Valley totaled 7,297 long tons in the first five months of 1937, against 6,083 and 6,367 tons, respectively, in the same periods of 1936 and 1935, according to a report from Vice Consul Reginald S. Kazanjian, of Para, Brazil. Should the present export rate prevail for the entire year, the total will be 17,500 tons, or 23% above that of 14,216 tons in 1936. Such a figure as 17,500 tons for 1937 would be the highest calendar-year exports of rubber from the Amazon Valley since 1930, when exports amounted to 21,148 tons. Increased consumption of the commodity in 1937 and higher market prices incidental to the control of rubber exports by the International Rubber Regulation Committee are held the causes of the rapid increase of rubber exports from the Amazon Valley. A similar export tendency has been noticed in other regions outside of the regulation scheme. The rubber produced in this territory comes almost entirely from uncultivated areas at a considerable distance from ports of shipment, and its connection therefore becomes unprofitable only at higher market prices.

Rubber Industry in Europe

GREAT BRITAIN

Expanded Chlorinated Rubber

First details regarding the production and development of expanded chlorinated rubber were published by Schidrowitz and Redfarn in 1935.[1] In their paper on expanded chlorinated rubber read at the International Rubber Conference, Paris, June 30, 1937, the investigators give details regarding some preliminary tests on the thermal and electrical properties of the material as reported by the Research Association of British Rubber Manufacturers. These already indicate that the new product should prove to be a very good insulating material.

In testing the thermal properties, the cellular rubber was compared with cork. The thermal conductivity of cork of the specific gravity used is given as 0.000097 in literature and that of the rubber material worked out at 0.000048. Owing to the difficulties connected with the determination of the heat conductivity of such a good insulator, results are not claimed to be accurate, but they do indicate clearly the superiority of expanded chlorinated rubber over cork as heat insulator.

The tests for electrical properties showed a surface resistivity of 1.6 by 10^{13} ohms/sq. cm. for a sample of expanded chlorinated rubber. British Standard Specifications No. 488/1933 require a surface resistivity of 10^{11} ohms/sq. cm., which proves the high resistivity of the rubber product. Incidentally the values for a sample of an average phenol-formaldehyde plastic were found to be 3 by 10^{11} ohms/sq. cm. Values for the volume resistivity were found to be so high that it was not practicable to obtain satisfactory measurements with the sample available at the time of testing. However it is estimated that the volume resistivity is at least 5 by 10^{15} ohms/cm. cube.

During the last two years a great amount of work has also been done to develop production on a commercial scale, particularly in putting out the material in board form, and a special extruding machine has been developed for the purpose. The investigators hope at a later date to give full details regarding methods and processes.

[1] See India Rubber World, Oct., 1935, p. 57.

Six Months' Imports and Exports

During the first six months of 1937, England imported 1,024,734 centals of crude rubber against 874,351 centals the year before, in addition to 46,819 centals of waste and reclaimed rubber as compared with 23,716 centals (cental equals 100 pounds). At the same time waste rubber exports rose considerably, 399,559 centals against 127,058 centals. In regard to rubber manufactures, there has been a steady increase in the quantity of rubber footwear imports, which rose from 346,351 dozen pairs in 1935, to 494,769 dozen pairs in 1936, and 503,050 dozen pairs in 1937. On the other hand exports of these goods underwent a sharp setback from 45,926 dozen pairs to 28,042 dozen pairs in 1937. Exports of tires and tubes, however, increased in the six months' period, the former from 2,474,892 to 2,613,668 units, and the latter from 1,702,414 to 1,791,500 units. Tire shipments to the Irish Free State have dropped steeply since 1935, and those to New Zealand and the Union of South Africa have also declined considerably, reflecting the development of the tire industry in those countries. On the other hand, India and other British countries have been increasing their purchases of British tires.

I. R. I. Program

Below appear the papers to be read during the Session 1937-38 of the Institution of the Rubber Industry.

London Section:

October 11. "Properties of Cement-Rubber Compositions for Floorings," by W. G. Wren.

November 8. "Pigments; Dye, Lake and Minerals for Rubber." Joint meeting with the Oil & Color Chemists Association.

December 13. "The Preparation of Latex and Determination of Quality," W. S. Davey and F. J. Croker.

January 10. "Asbestos and Rubber," F. G. Payne.

February 14. "Calendering Practice," W. H. Reece.

March 14. "The History of the Plantation Rubber Industry," B. D. Porritt.

April 11. Short Papers Night.

Manchester Section:

October 18. "Rubber Proofing." Symposium.

November 15. "The Effect of Machine Development of Rubber Manufacture," H. Smith.

December 13. "The Field of Rubber in Chemical Engineering," S. A. Brazier and G. F. Thompson.

February 4. "The Approach of Plastics to Rubber," H. Barron. Joint Meeting with the Society of Chemical Industry and Plastics Group.

Scottish Section, Edinburgh:

November 12. "Chlorinated Rubber," D. R. Baxter. Joint Meeting with the Society of Chemical Industry.

December 7. "Factors Affecting the Vulcanization Reaction in Footwear Compounds," R. C. Davies.

Midland Section:

October 13 or December 8. Birmingham. "Rubber in Agriculture," Alexander Hay.

February 9. Birmingham. "Some Principles of Tire Design," H. A. Brittain.

March 9. Birmingham. "Material Specifications and Specification Tests." H. W. Rowell.

April. Wolverhampton. "Thermo-electric Pyrometry in the Rubber Industry." E. Simpson.

Preston Section:

November 8. "Modern Compounding." E. H. Hurlston.

December 13. "The Factory Act and Its Application to the Rubber Industry." Chas. W. Price.

January 10. "Calendering Practice." W. H. Reece.

West of England Section, Melksham:

October 6. "Rubber in Agriculture," Alexander Hay.

November 3. "The Effect of Machine Development on Rubber Manufacture," H. Smith.

January 5. "Factice of Neoprene," J. H. Carrington.

February 2. "Calendering Practice," W. H. Reece.

March 2. "Application of Rubber to the Modern Motor Car," C. G. Williams.

Leicester Section:

November. "Rubber in Agriculture," Alexander Hay.

December 15. "Modern Compounding," E. H. Hurlston.

January 19. "Calender Practice," W. H. Reece.

February 16. "The Effect of Machine Development on Rubber Manufacture," H. Smith.

March 17. "Principles of Organization in Relation to Production," Major Urwick.

April 13. "Rubber Machinery," F. Siddall.

Rubber Suit Aids Stratosphere Flight

Donning a special rubber suit and oxygen helmet, Flight Lieutenant

M. J. Adams, of the British Royal Air Force, on June 30 rose in an airplane to a record height of 53,937 feet, approximately 10 miles, over the south of England. At sea level atmospheric pressure on our bodies is about 15 pounds per square inch, while at 25,000 feet, less than half the altitude of this flight, the pressure is only about 5.5 pounds per square inch. Even though pure oxygen could be breathed, a feat technically impossible, the use of a pneumatically sealed suit capable of withstanding high internal pressure is a necessity at very high altitudes where the pressure is too low to sustain life.

Before this flight was made Lieutenant Adams, wearing the special rubber suit and helmet, underwent strict tests in a decompression chamber. By removal of air from this chamber he was subjected to stratospheric pressure conditions equivalent to those of an ascension of more than 50,000 feet.

Notes

Sir Hugh Trevor Dawson, a director of the British Molded Hose Co., Ltd., and of the Stepney Tire & Rubber Co., has been appointed assistant managing director of British Tire & Rubber Co.

At the annual dinner of the Wensleydale Longwool Sheep Breeders Association, J. B. Smalley related that he had placed the whole of his clip at the disposal of a national firm interested in producing tire linings from wool.

Under the name of Stafix Permanent Traffic Lines, Ltd., a company has been formed in London to acquire patents and contracts of the Stafix specialties, as Stafix metallized rubber traffic lines and stops and similar devices intended to promote road safety. The share capital of the firm is £30,000.

Metalastic, Ltd., a company associated with the John Bull Rubber Co., Ltd., has been formed in Leicester to develop and produce anti-vibration mounting units made of rubber bonded to metal.

An all-vegetable product which, it is claimed, will not only clean rubber floors, but preserve them too has recently been put on the market under the name of Soapene by Rubber Improvements, Ltd., London.

Paragum, Ltd., formed a few months ago, exploits a patent for the manufacture of Paragum, which the manufacturer defines as a processed rubber latex, self-vulcanizing, stabilized, and easily controlled. It gives, it is claimed, a dried-out rubber superior to preparations hitherto available. With Paragum, stabilization is said to be such that any degree of viscosity and setting point can be easily obtained and controlled according to the destined use. With Paragum, the difficulties attending the addition of vulcanizing ingredients, accelerators, and fillers to latex solutions are largely overcome so that mixes can be prepared with a working life of almost any desired period. The product, which has the further advantage of being odorless, is recommended for the manufacture of gloves, bathing caps, and other dipped goods, in paper manufacture, in the textile trade for laminating and rubberizing fabrics, as an enamel, in the toy trade for forming faces of dolls and animals, and finally for adhesives in various industries.

GERMANY

Rubber Membranes for Diasolysis

Diasolysis, a process for dissolving certain substances through a solvent membrane, was discovered by H. Brintzinger and H. Beier, of the University of Jena, Germany. In their investigations they found that a number of substances, such as aniline, would dissolve through a membrane made of rubber or gum. However these membranes are not permeable to a large number of other substances, such as salt and sugar. Thus nondiasolyzable substances can be separated from diasolyzable substances. This process should not be confused with dialysis where separation is dependent on the porosity of the membrane and not its solvent action.

Notes

The special 100% import duty on crude rubber, gutta percha, and balata, which went into effect May 13, 1937, is yielding the revenue hoped for. In May the duty on rubber alone brought in 912,375 marks; in June, 7,895,900 marks; and in July, 9,845,000 marks; for balata and gutta percha, the amount for the whole period was 47,625 marks, or altogether roughly 18,700,000 marks. It is intended that the proceeds of the duty be used to finance large-scale manufacture of Buna, and the tax be abolished when that end has been attained. According to the above, 18,700,000 marks were available the end of July.

Incidentally, an interesting note on Buna appears in "Sketches from My World Trip," by the editor of the *Gummi-und-Asbestos Zeitung*.[1] While on a world tour he visited Singapore and, when inspecting the Singapore Rubber Works, he noticed some corrugated hose of at least half a meter in diameter which he was informed was intended for conveying benzine and was made resistant to benzine by the employment of Buna in its manufacture. The synthetic rubber Buna, then, is now being exported to Malaya, chief center of plantation rubber production.

A bullet-proof tire said to fill all requirements as to speed, softness, and durability, is shown in a recent issue of *Gummi-Zeitung*. The tire, a sectional, cellular type, consists of hollow pieces with specially designed cut-outs, alternating with other pieces quite solid except for a sloping vent which connects the individual hollow spaces. The tire, mounted on a kind of straight-side rim, is held in place by steel wires which pass through the pieces on either side. Each of the sections, both hollow and solid, has a small cut-out at the bottom which fits over a corresponding perforation in the rim and thus communicates with the air outside. When the tire revolves, a kind of pumping action results, said to cool off the tire. Tests have shown, it is claimed, that rifle shots leave barely perceptible holes which close of themselves, and even shells do not cause sufficient damage to render it impossible to continue using the tire.

C. G. Haubold A.G., Chemnitz, manufacturer of machinery, celebrated the centenary of its foundation on October 7, 1937. The enterprise, which has remained in the same family these 100 years, builds machinery for various industries including paper, textiles, refrigeration, artificial silk; to the rubber industry it is best known for its mixing, washing, and milling machines, calenders, spreaders, mills for It-packing, etc. Recently it developed special machinery for use in the production of Buna. The firm, capitalized at 3,600,000 marks, reported increased business during 1936. It booked net profits of 112,000 marks, against 91,000 marks the year before, carried forward.

German crude rubber imports continue to increase rapidly. Totals for July, 1937, were 79,886 quintals, against 69,551 quintals in July, 1936; August arrivals amounted to 89,000 quintals, against 67,000 quintals in August, 1936. At this rate Germany's total imports for the current year may well reach, if not exceed, 1,000,000 quintals.

[1] Sept. 10, 1937.

EUROPEAN NOTES

American firms are said to be backing a new company in Bucharest, Roumania, which is to manufacture tires and tubes of all kinds. The new concern, known as the B.A.N.L.O.C. and capitalized at 300,000,000 lei, has received special privileges from the government.

Various reports concerning experiments with synthetic rubber in Czechoslovakia have been published from time to time. According to the latest, it is expected soon to be able to produce synthetic rubber by following the Russian method employing alcohol as the base. It appears that a small trial plant will first be started, and if this proves successful, it is proposed to produce synthetic rubber on a scale calculated eventually to meet the greater part of the local demand.

In Denmark liquid latex for the past two years has been used for manufacturing rubber boots and other products by the Kaytex Rubber Co., Copenhagen. A process based on a British patent is employed, the articles are made in molds directly from the latex. The goods thus produced, especially the footwear, appear to be gaining favor in Denmark, and the Danish com-

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Rubber Industry in Far East

NETHERLAND INDIA

Rubber Exports

Final figures on rubber exports from Netherland India in July, 1937, issued by the Central Bureau of Statistics, indicate that Java and Madura estates exported 7,640 tons including 7,100 kilos of latex, besides 3,245 kilos in the form of tires and 824 kilos in the form of tire waste. Estates in the Outer Provinces shipped 11,486 tons including 1,057 tons of latex; while native exports were 25,822 tons. Total shipments for the month, therefore, came to 44,952 tons.

Manuring Problems

At a meeting of the Malang Planters, Dr. De Jong, of the Malang Experiment Station, in a stimulating discussion, set forth two new angles on manuring rubber. First was the problem of manuring young rubber to hasten the tappable stage. Several experiments are under way to determine how this end can be best attained. So far results indicate that continued manuring during the early years of growth stimulates girth development in a satisfactory manner, and if this continues, a fairly considerable increase in girth may be counted on eventually as a consequence of manuring.

The second problem was that of manuring old rubber. In Malang especially various old rubber plantations give very good yields, and producers naturally hesitate to cut these out to make way for young rubber. The experiment station is conducting trials to discover what may be attained by manuring old rubber.

Brown Bast

For a good many years comparatively little has been heard about brown bast, but now that increasing areas of budded rubber are coming into tapping, interest in this disease is reviving. At a meeting of the Besoeki planters Dr. J. Schweizer, director of the Besoeki Experiment Station, discussed the underlying causes of the disease. Hitherto it has been assumed that it is caused by excessive removal of water or too great loss of valuable nutritive substances. This, of course, is correct in a general way, but it does not explain the direct cause of the disease; furthermore its acceptance prevents recognition of the disease until it is in an advanced stage. Analysis of the composition of the latex has shown that the well-known symptoms of brown bast really signify the end of a process which has developed much earlier in the latex and the beginnings of which could have been detected by examination of the latex, when suitable measures could have been taken.

Over-tapped trees will develop brown bast, and it has been found that the composition of the latex of overtapped trees undergoes a complete change: the concentration of the rubber in the latex decreases; the total serum constituents decline; while the mineral constituents increase to more than double the normal amount, and there is a marked tendency to precoagulation. Furthermore such abnormal latex lacks calcium, but contains double the usual amount of potash, a condition which promotes coagulation in the latex cells with consequent destruction of the tissues.

These observations and others on the regeneration of latex in relation to the bark area drained indicate that it will prove necessary to study each clone with a view to discovering the best individual tapping system for a clone by which maximum output may be obtained without damage to the tree.

Rubber Sheet Factories

The cooperative native rubber sheet factory recently opened in Leuwiliang is operating satisfactorily, it is reported, and 11 other factories are practically ready to start working. The output of these small factories is, of course, not large, but the enterprises deserve attention as illustrating the government's attitude toward native production.

Each of the above little factories, it should be noted, is maintained by a group of native producers, and the 12 factories in their turn cooperate with each other.

Bata Footwear Factory

Some months ago it was reported that the Netherland India Government planned to establish a rubber shoe factory if private parties did not undertake such an enterprise. For some time the Bata concern has been known to be interested in the manufacture of rubber footwear here, and it now appears that the company has laid before the Department of Economics detailed plans of the factory and operations it has in mind in connection with large-scale production. It is further learned that the company not only has the necessary machinery in Czechoslovakia ready for immediate shipment, but has already sent for four experts who are on their way out.

Besides Bata several local firms have applied to the Department of Economics. It is understood, however, the government wishes the establishment of only one factory, and it seems probable that it will decide in favor of Bata.

PHILIPPINE ISLANDS

The development of the rubber industry in the Philippines by inviting American capitalists to help in the program is being planned. For many years there has been a plan for this expansion, but owing to lack of capital, the cultivation of rubber on a large commercial scale has not been possible. Particularly in Mindanao and Basilan Island are large fertile regions suitable for rubber growing. Filipino industrialists and officials including President Manuel L. Quezon have realized the need of American aid and are taking steps to induce outside capital to cooperate. The project is said to include financing of a rubber plantation by the government, possibly through the National Development Co., combined with the colonization plan sponsored by the government, with the latter furnishing the lands to colonists who wish to produce rubber.

The importation of rubber goods and the number of rubber shoe manufacturing plants are increasing every year. Thus it is believed in Philippine circles that there is ample justification for building up not only the growing of rubber, but also certain phases of rubber goods manufacture.

The Goodyear company is one of four firms already growing rubber in the Philippines, and available figures for 1937 show that they produced 223 tons of rubber. Of the other three companies, the Basilan produced 160 tons, American 545 tons, and Rio Grande 60 tons, making in all 988 tons.

There appear to be four establishments producing rubber-soled shoes in the Philippines. Their total output in 1936 amounted to 2,481,000 pairs; while their consumption of crude rubber came to 372 tons. The estimated output of this type of footwear for 1937 is put at 3,100,000 pairs, and absorption is expected to be 450 tons.

MALAYA

Small Holdings

The untapped areas on small holdings have decreased considerably from June, 1936, to June, 1937. At the former date the total area out of tapping was 428,700 acres, or 36.8% of the total tappable area. By March, 1937, this had declined to 298,600 acres, or 25.7%, and showed a further drop to 195,300 acres, or 16.8%, by June, 1937.

Production of rubber reflected this increase in tapping and rose considerably during the first half of 1937 when the total was 85,584 tons as compared with 59,030 tons in the same period of 1936.

Wet weather in April this year caused virulent attacks of moldy rot in some districts; some outbreaks of *Oidium* were reported, but were fortunately not of a serious nature; excessive tapping in a district in Johore was responsible for a considerable increase of brown bast.

Natives in Johore and Perak are reported to be taking up budding in a small way.

Budded Rubber Problems

Now that budded areas are being tapped, planters find themselves face to face with a new set of problems. In a recent issue of the *Straits Times*, the Planting Correspondent quotes from letters he received on the subject. One writer, an owner-planter, states that he has 200 acres of budded rubber which has been in tapping six months. While yields are good, considerable difficulty is experienced in the factory. Even with the greatest care hardly 10% of No. 1 Sheet is obtained. The sheet is poor looking and bubbly, and there is an unduly high percentage of lump due to late dripping. His clones include Avros clones, Tj.1 and 16 and B.D.5. The latex from Avros 49 gives the most trouble and refuses to coagulate at all unless mixed with other rubber. The Tj. clones are very good yielders, but the trunks are very poor and liable to wind-breaks.

"I cannot help thinking," says this planter, "that the next few years will see some disappointments and the ultimate gain of budded rubber over seedling rubber, given equal consideration and care, will be problematical."

Other planters too have met with similar difficulties, and excerpts are given from letters of a visiting agent and a second planter showing how these have been met. Incidentally, in all three cases latex from Avros 49 gave the most trouble, although Planter No. 1 was the only one who found that it would not coagulate. In the other two cases the difficulty took the opposite form—there was a great deal of trouble owing to pre-coagulation in the cups. With regard to late dripping, the visiting agent said that he had found this to occur until the clones got accustomed to the operation of tapping, after about a year. He also points out that much has yet to be learned regarding suitable tapping systems for clones. Probably he has hit the nail on the head, and the solution of many of the problems connected with the exploitation of budded rubber will be found when the proper tapping methods have been evolved.

Planter No. 2 says he was able to improve the quality of his sheet by taking the following precautions: Using an increased quantity of sodium in the field to prevent pre-coagulation. Speeding up of collection, transport of latex to factory, and coagulation in factory. Coagulating the latex from Avros 49 separately in the factory. Bulking all the latex and adding the correct quantity of water before final straining. Finally, and most important, straining very carefully.

When one reads these measures, one can sympathize with Planter No. 1 when he queries in his letter: "Surely, if all this care and specializing are necessary where is the ultimate gain over good seedling rubber?"

Notes

About 400 square yards of rubber paving on Victory Ave., Kuala Lumpur, has just had to be taken up as it proved unsatisfactory. The paving, patented by the planters, Kendall and Graham, consisted of 44 sheets of vulcanized rubber, 7/8-inch thick, protected by canvas, was laid in June 1933, and was bonded with asphaltum F. heated to 350° F. The rubber surface was hardly worn, but all the sheets were warped owing to the failure of the binding material, which permitted water to penetrate under the sheets.

In England on August 6 died Arnold Sharples, 50, formerly of the Department of Agriculture, Federated Malay States, and later member of the staff of the Rubber Research Institute of Malaya. Mr. Sharples came to Malaya in 1913 and joined the Rubber Research Institute in 1930. In 1933 he returned to England, subsequently publishing his book, now widely read by planters, on "Diseases and Pests of the Rubber Tree."

The Bruas Rubber Co., Ltd., Bukit Klian Rubber Co., Ltd., and Ligertwood Rubber Estates, Ltd., have gone into voluntary liquidation. The three companies have been absorbed by the Amalgamated Bruas Rubber Estates, Ltd., recently formed in London.

Considering that much rubber land in the next few years will be found to contain tin and that therefore large areas of rubber will be cut out, planters are urging the government to remove the ban on new planting to make up for the rubber cut out for tin mining. At present replacement of rubber destroyed by mining is not permitted, but it is hoped that when renewal of restriction is considered, the government will insist that such areas may be replaced. At a recent meeting of the Malayan Estate Owners' Association the matter was discussed, and it was pointed out that there is a considerable amount of reserve land allocated for rubber that is still unplanted and that replacement of rubber on suitable land was probably preferable to replanting.

EUROPEAN NOTES

(*Continued from page* 70)

pany has been able to compete with other footwear offered on the local market. It is said to have sold already 100,000 pairs of rubber boots.

While Austria's crude rubber imports rose from 19,297 quintals in the first half of 1936 to 24,401 quintals in the same period of 1937, there was a distinct falling off in foreign business, particularly in the quantity of goods exported. Imports were 5,905 quintals, against 6,116 quintals; while exports were 13,660 against 15,020 quintals. The values of imports and exports slightly increased as compared with those of the 1936 period, but as this gain was due to the general rise in prices, they are unimportant. Among the imports, increases were noted in footwear, 156 against 133 quintals; automobile tires, 2,137 against 2,054 quintals; and belting, 275 against 213 quintals; but cycle tires dropped from 635 to 590 quintals, and uncovered thread from 470 to 361 quintals. Gains in exports of hose, 1,973 against 1,584 quintals; packing, 3,955 against 3,162 quintals; belting, 517 against 453 quintals; and hard rubber, 1,050 against 768 quintals; were more than offset by losses in exports of footwear, 95 against 131 quintals; automobile tires, 732 against 1,404 quintals; bathing caps, 458,891 against 510,239 units; and toys, 687 against 966 quintals.

Semperit Oesterreichisch-Amerikanische Gummiwerke A.G., Vienna, reports better business in 1936, when net profits increased to 316,534 schilling, on a capital of 16,000,000 schilling. This amount and the carry forward of 336,398 schilling, in all 652,932 schilling, were again carried forward. The company has been installing new machinery and generally reorganizing its plant to increase efficiency. The affiliated concerns, Vereinigte Gummiwaren-Fabriken Wimpassing, vorm. Menier-J. N. Reithoffer, Wimpassing, Austria, and the Matador Gummiwerke A.G., Prague, Czechoslovakia, also report improved business although export business continued to cause some anxiety at the first-named company and the latter was handicapped by the devaluation of the Czech krone.

Paul Klein, first managing director of Hungarian Rubber Goods Factory, Ltd., Budapest, Hungary, recently was in a motor car accident from which he suffered minor fractures. His condition has improved considerably, however, and he is expected to resume his duties very soon.

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BOOK REVIEWS

"Polymerization." Robert E. Burk, Howard E. Thompson, Archie J. Weith, and Ira Williams. Published by Reinhold Publishing Corp., New York, N. Y. 1937. Cloth, 6 by 9 inches, 312 pages. Index. Price $7.50.

This book, an American Chemical Society monograph (No. 75), presents the theoretical aspects of polymerization, a type reaction of broad interest, and its applications in the fields of rubber, synthetic resins, and petroleum. The authors have succeeded in arranging the material in a way which provides an up-to-date and accurate impression of the subject. The work is timely as recent industrial advances in this field are proceeding at a lively rate. No attempt, however, has been made to produce a complete encyclopedia on the subject.

About half of the book is devoted to theory, which stresses the rate and mechanism of polymerization reactions as related to the molecular structure of the starting materials and the presence of catalysts. Considerable detail on polymer structure is given in the chapters on the rubber and synthetic resin industries. Listed in Chapter III in tabular form are 838 different combinations of catalysts and substances to be polymerized, giving in most cases the reaction conditions, products, and literature reference. This arrangement is according to catalyst, but a cross-index lists the substances to be polymerized in alphabetical order. A different aspect of polymerization is encountered in the chapter on the petroleum industry, where it causes the degradation of valuable products such as gasoline and lubricating oils.

The chapter on polymerization in the rubber industry, 23 pages in length, is divided into three sections: natural rubber, synthetic rubber, and commercial synthetic rubber. The section on natural rubber reviews somewhat briefly the research investigations, relating to polymerization, on the structure and cyclization of rubber, and vulcanization. The second section contains a general discussion of the raw materials and polymerization methods used in the production of synthetic rubber. The commercial synthetics discussed are methyl rubber, butadiene rubber, chloroprene rubber, mixed polymers, and rubber-like plastics. At the end of each chapter are numerous references to the literature. Besides the regular subject index, the book has an author index.

"Synthetic Rubber." W. J. S. Naunton. Macmillan & Co., Ltd., London, England. 1937. Cloth, 5½ by 8½ inches, 162 pages. Illustrated. Index. Price 7s.6d.

Through limitation of involved technical discussion, the author has produced a book of interest to the layman as well as the technical worker. The book, consisting of nine chapters, deals with the history, economic aspect, chemistry, physics, technology, and applications of synthetic rubber. Other topics covered are the borderland between rubber and resins, synthetic rubber latex, and the future outlook regarding the development of synthetic rubber. Covering such a wide range of topics in the space of a small volume has necessitated a somewhat brief treatment of the subject matter. The chapter on the technology of synthetic rubber, which goes into greater detail than the other chapters, occupies almost one-third of the book.

Throughout the book the author has devoted the majority of his discussion to Neoprene because, he states in the preface, "Neoprene is the only synthetic rubber generally available at the present time in Great Britain."

However "Thiokol," a product claimed to have been sold extensively in Great Britain and Europe since 1933, is regarded generally in the United States as a "synthetic rubber," along with Neoprene.

In the recently published A.C.S. Monograph "Chemistry and Technology of Rubber," T. Midgley, Jr., in the chapter on synthetic and substitute rubbers, states, "Probably the most remarkable discovery in the field of synthetic rubber in recent times is that of the substances named Thiokols." After discussing various synthetics including "Thiokol" and Neoprene, he further states, "All the products just mentioned are properly called Synthetic Rubbers." In this same chapter Midgley sets forth the following definition: "'Synthetic rubbers are those organic substances which possess the property of forcibly retracting to approximately their original size and shape after being greatly distorted, i.e. such as being stretched x per cent of their original lengths.' Here x is some arbitrary value. It should be over 100, probably 400, possibly 600, but certainly not higher."

In discussing the "borderland between rubber and resins" Dr. Naunton proposes this definition: "A rubber is any substance which shows elasticity of 800% or more with a quick return ('snap') at temperatures at which natural rubber shows the same effect and which does not lose this property upon storage any sooner than does natural rubber."

With this definition as a basis, Dr. Naunton designates the long-chain polymers produced by the condensation of dihalogenated hydrocarbons with metallic polysulphides as "borderline products, which must be placed further away from the elastic end of the elastic-plastic scale than the butadiene polymers."

It is claimed by the manufacturers of "Thiokol" that an elasticity of 800% can be obtained and that under Dr. Naunton's definition as given above "Thiokol" would qualify as a synthetic rubber. With respect to characteristics and application it would appear that Neoprene and "Thiokol" should fall within a general classification.

"Elasticity, Plasticity, and Structure of Matter." R. Houwink. The Macmillan Co., New York, N. Y. and Cambridge University Press, London, England. Cloth, 5½ by 8½ inches, 376 pages. Illustrated. Index. Price $6.

The study of elastic and plastic deformation is advancing rapidly in a variety of fields. According to the author, a unity of thought is generally lacking among the workers in these fields; hence one of his foremost tasks was to trace such a unity wherever possible. This work was accomplished by noting the degree of conformity of widely different substances to the general laws of deformation. In the case of materials exhibiting extraordinary deformation phenomena, the degree of divergence was examined.

Another purpose of this book is to show the correlation between physical formulas based on experimental observation and the structure of matter. Ability to forecast the behavior of a material upon deformation on the basis of its structure is, in the opinion of the author, the key to the deliberate synthesis of materials with definite desired elastic and plastic properties.

The book opens with a general discussion on the subject, explaining the various phenomena related to deformation and outlining the methods of measuring them. The theoretical aspects of the subject are next set forth, this section being concluded by a chapter on the plasticity of crystals written by W. G. Burgers.

The final and larger section of the book considers typical examples of elastic and plastic materials such as glass, resins, asphalt, rubber, cellulose, proteins, paints, clay, and sulphur. The chapter on rubber (58 pages) concerns itself with the chemical structure and the plastic and elastic behavior of rubber. Also, theories regarding the molecular structure of rubber are discussed. Other topics covered are ebonite, gutta percha, balata, and artificial rubbers such as the chloroprene and polyethylene tetrasulphide types. In this chapter the author has succeeded, through concise and unified arrangement of salient data, in presenting an informing treatise.

"Dechema Monographien." Volume 9. Edited by Dechema, Deutsche Gesellschaft für Chemisches Apparatewesen E.V. Published by Verlag Chemie, G.m.b.H., Berlin, Germany, 1937. Paper, 6 by 9 inches, 169 pages.

The ninth volume of this series, which is edited by the German So-

(*Continued on page* 80)

Patents and Trade Marks

MACHINERY

United States

2,092,813. **Molding Apparatus.** A. W. Oakleaf, Detroit, Mich., assignor to United States Rubber Products, Inc., New York, N. Y.
2,093,922. **Vulcanizer.** H. Meyer, Hanover, Germany.
2,094,157. **Molding Apparatus.** R. B. Lowry, Niagara Falls, assignor to Hooker Electrochemical Co., New York, both in N. Y.

Dominion of Canada

368,590. **Tire Tube.** K. B. Kilborn, Akron, O., U. S. A.
368,690. **Heel Washer Inserting Means.** Wingfoot Corp., Wilmington, Del., assignee of H. E. Morse, Akron, O., both in the U. S. A.
368,719. **Tire Inflator.** K. M. Moody, Chicago, Ill., U. S. A.
369,056. **Tire Groover.** E. Piquerez, Paris, France.
369,107. **Apparatus to Make Rubber Articles.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of P. P. Crisp, Stow, and W. E. Haggan, Akron, co-inventors, both in O., U. S. A.

United Kingdom

465,224. **Molds.** International Latex Processes, Ltd.
465,264. **Tire Valve Connectors.** W. Turner.
465,269. **Apparatus to Mold Soles and Heels to Footwear.** Footwear Machinery, Ltd., and L. Brown.
465,460. **Rubber Dipping Mold.** A. N. Spanel.
465,666. **Horseshoes.** J. E. Anderson.
465,917 and 465,921. **Apparatus to Mold Shoes.** O. Coda.
466,288. **Wheel Tire Mold.** Dunlop Rubber Co., Ltd., H. Willshaw, and H. Taylor.
466,470. **Tire Molds.** Continental Gummi-Werke A.-G.
466,522. **Rubber Groover.** H. Patchett.
466,629. **Apparatus to Coagulate Latex.** R. F. McKay. (Soc. Italiana Pirelli.)
466,774. **Tire Vulcanizer.** W. H. Welch.
467,471. **Tire Tread Slitter.** Consolidated Rubber Manufacturers, Ltd.
467,709. **Tire Building Machines.** Dunlop Rubber Co., Ltd.
467,807. **Tool for Stretching Rubber.** P. Hellermann.

PROCESS

United States

2,092,825. **Increasing Viscosity of Latex Mixes.** A. Behr, Paris, France.
2,092,928. **Transferring Designs on to Rubber.** J. S. C. Moody and H. M. Phinney, both of Somerville, Mass.
2,093,411. **Coating and Sheathing for Cables.** E. Bowden, London, and D. O'Duffy, Middlesex, assignors to Enfield Cable Works, Ltd., London, all in England.
2,093,737. **Ball.** M. B. Reach, Springfield, Mass., assignor to A. G. Spalding & Bros., New York, N. Y.
2,093,904. **Belting.** J. M. Bierer, Waban, assignor to Boston Woven Hose & Rubber Co., Cambridge, Mass.
2,093,909. **Doll Heads.** H. M. Dodge, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,094,074. **Cushion Unit.** R. K. Lee, Highland Park, C. A. Tea, Detroit, and H. C. Anderson, Highland Park, assignors to Chrysler Corp., Detroit, all in Mich.
2,094,263. **Preserving Rubber.** A. M. Clifford, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.
2,094,408. **Preparing Chlorinated Rubbers.** L. Orthner and O. Bohme, Leverkusen-I. G. Werk, and G. Meyer and W. Becker, all of Cologne-Mulheim, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfurt a.M., all in Germany.
2,095,107. **Depositing Rubber.** A. **Szegvari,** assignor to American Anode, Inc., both of Akron, O.
2,095,119. **Rubber Strips.** C. L. Beal, Cuyahoga Falls, assignor to American Anode, Inc., Akron, both in O.
2,095,529. **Rubber Thread.** C. T. Pastor, Krefeld, Germany.
2,095,673. **Treating Rubber.** H. R. Minor, Oak Park, Ill., assignor, by mesne assignments, to Industrial Process Corp., Saratoga Springs, N. Y.
2,095,927. **Pine Tar and Rubber Products.** H. A. Endres, Silver Lake, O., assignor to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

368,572. **Hose Splicing.** K. M. Dawson, Port Arthur, Ont.
368,675. **Rubber Manufacture.** Rubatex Products, Inc., New York, N. Y., U. S. A., assignee of F. W. Peel, London, England.
368,959. **Porous Rubber.** Dewey & Almy Chemical Co. of Canada, Ltd., Farnham, P. Q., assignee of E. A. Hauser, Cambridge, Mass., U. S. A.
368,960. **Battery Plate Manufacture.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of E. Hazell, New York, N. Y., and A. W. Keen, Passaic, N. J., co-inventors.
369,045. **Upholstery Padding Material.** J. A. Howard, London, England.
369,101. **Transparent Moistureproof Pellicle.** DuPont Cellophane Co., Inc., New York, assignee of T. G. Finzel, Kenmore, N. Y., U. S. A.
369,250. **Foraminous Coated Material.** Perfotex Co., assignee of F. J. Chandler, both of Toledo, O., U. S. A.

United Kingdom

465,226. **Concentrating Latex.** Rubber Producers Research Association. (E. Rhodes and J. H. Piddlesden.)
465,598. **Bituminous Compositions.** A. E. H. Dussek.
466,016. **Rubber Threads.** H. Schuller, E. Matzner, and A. Kailich.
466,181. **Printing Processes.** W. E. Ellens and J. Dickenson & Co., Ltd.
466,304. **Isomerized Rubber.** Okonite Co.
466,447. **Elastic Fabrics.** International Latex Processes, Ltd.
466,452 and 466,453. **Attaching Rubber to Metal.** F. Schuster.
466,681. **Compound Sheet Materials.** L. Falk.
466,733. **Creping Paper.** Zellstoffabrik Waldhof and R. Haas.
466,884 and 466,885. **India Rubber.** F. K. Daniel.
466,906. **Securing Cushion in Position.** Accles & Pollock, Ltd., and D. C. Allday.
466,990. **Rubber Fiber Compositions.** C. Weisleder.
467,083. **Rubber Threads.** T. L. Shepherd.
467,123. **Rubber Threads.** International Latex Processes, Ltd., and R. G. James.
467,158. **Rubber Threads.** T. L. Shepherd.
467,192. **Sponge Rubber.** F. Bethell and G. Wood.
467,659. **Knitting Elastic Fabric for Corsets.** R. F. Raven and H. A. Raynor.

CHEMICAL

United States

2,093,105. **Latex Adhesive.** I. Wolff, New York, N. Y.
2,094,220. **Adhesive Composition.** I. I. Slomon, Hollis, N. Y.
2,094,933. **Halogenated Rubber Derivatives.** H. A. Winkelmann, assignor to Marbon Corp., both of Chicago, Ill.
2,094,934. **Hydrohalogenated Rubber Halides.** H. A. Winkelmann, Chicago, Ill., assignor, by mesne assignments, to Marbo Patents, Inc., a corporation of Del.
2,094,935. **Shellac-Rubber Hydrohalide Compositions.** H. A. Winkelmann, assignor to Marbon Corp., both of Chicago, Ill.
2,095,113. **Rubber - Polymerized Vinyl Chloride.** J. E. Wolfe, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
2,095,630. **Rubber Compounding Materials.** A. B. Cowdery, Needham, Mass., assignor to Barrett Co., New York, N. Y.
2,095,921. **Age Resister.** A. M. Clifford, Stow, O., assignor to Wingfoot Corp., Wilmington, Del.

Dominion of Canada

368,640. **Protective Composition.** Bakelite Corp., New York, N. Y., assignee of E. R. Hanson, Bloomfield, N. J., both in the U. S. A.
368,689. **Accelerators.** Wingfoot Corp., Wilmington, Del., assignee of J. G. Lichty, Stow, O., both in the U. S. A.
368,919. **Rubber Bitumen Composition.** signee of E. R. Dillehay, Glen Ellyn, Richardson Co., Cincinnati, O., as-Ill., both in the U. S. A.

368,925. **Rubber Accelerator.** Wingfoot Corp., Wilmington, Del., assignee of A. M. Clifford, Stow, O., both in the U. S. A.

368,926. **Rubber Antioxidant.** Wingfoot Corp., Wilmington, Del., assignee of A. M. Clifford, Stow, O., both in the U. S. A.

369,085. **Coating Compositions.** DuPont Cellophane Co., Inc., Wilmington, Del., assignee of W. H. Charch, Buffalo, and A. Hershberger, Kenmore, co-inventors, both in N. Y., all in the U. S. A.

369,088. **Compounding Ingredient.** Peter Spence & Sons, Ltd., assignee of A. L. Hock, A. Kirkham, and H. Spence, all of Manchester, England.

369,095. **Plasticizers for Chlorinated Rubber.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. P. Baxter, Widnes, and F. P. Leach, Frodsham, co-inventors, both in England.

369,212. **Chlorinated Rubber Stabilizer.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. G. Moore, Runcorn, England.

369,266. **Accelerators.** Wingfoot Corp., Wilmington, Del., assignee of W. Scott, Akron, O., both in the U. S. A.

United Kingdom

465,037. **Footwear Adhesive.** British United Shoe Machinery Co., Ltd., and D. B. MacDonald.

465,209. **Solution for Treating Rubber Threads.** Latex Yarn & Lactron Thread, Ltd., and R. G. James.

465,558. **Sealing Material.** G. G. White and C. G. Mayor.

465,786. **Vulcanizable Plastic Products.** Thiokol Corp.

466,174. **Compounding Ingredients.** G. W. Johnson. (I. G. Farbenindustrie A.G.)

466,270. **Artificial Resins.** G. W. Johnson. (I. G. Farbenindustrie A.G.)

466,344. **Dispersing Composition.** G. W. Johnson. (I. G. Farbenindustrie A.G.)

466,345. **Wetting Agents.** G. W. Johnson. (I. G. Farbenindustrie A.G.)

466,375. **Gasket Compositions.** Crown Cork & Seal Co., Inc.

466,490. **Coating Composition.** British Celanese, Ltd.

466,565. **Latex Composition for Gaskets.** Dewey & Almy, Ltd.

466,751. **Adhesives.** Boston Blacking Co., Ltd.

466,934. **Accelerator for Sponge Rubber.** Dunlop Tire & Rubber Corp.

467,141. **Card Clothing.** Continental Gummi-Werke A. G.

467,180. **Impregnating Compositions for Electric Insulation.** Callender's Cable & Construction Co., Ltd., and R. S. Vincent.

467,202. **Composite Rubber Articles.** B. J. Habgood and Imperial Chemical Industries, Ltd.

467,402. **Compound Sheet Materials.** F. B. Dehn. (Rohm & Haas A. G.)

467,492. **Latex. F. B. Dehn.** (Rohm & Haas A. G.)

467,529. **Oil Containers.** C. Arnold. [Standard Oil Co. (Ohio).]

467,531. **Rubber Derivatives.** Rubber Producers Research Association, E. H. Farmer, H. P. Stevens, and J. W. Rowe.

467,576. **Sulphur Compositions.** W. W. Duecker and C. R. Payne.

467,772. **Isomerized Rubber.** Wingfoot Corp.

467,901. **Lacquers.** British Cellophane Co., Ltd.

GENERAL

United States

2,092,756. **Elastic Foraminous Sheet Material.** J. Grabec, assignor of one-half to A. Ledofsky, both of Bratislava, Czechoslovakia.

2,092,808. **Hat Adjusting Means.** S. Lipton, New York, N. Y.

2,092,820. **Plug Cap.** E. J. Te Pas, Rocky River, and W. A. Frantz, Shaker Heights, both in O., said Te Pas assignor to said Frantz.

2,092,900. **Foundation Garment.** H. Wipperman, assignor, by mesne assignments, to H. W. Gossard Co., both of Chicago, Ill.

2,092,978. **Grinding Disk.** T. L. F. Larsson, assignor to Norton Co., both of Worcester, Mass.

2,092,981. **Refrigerator Car Bulkhead.** J. S. Lundvall, assignor to Union Asbestos & Rubber Co., both of Chicago, Ill.

2,093,110. **Body Brush.** J. P. and J. T. Melcady, both of Newark, N. J.

2,093,284. **Work Engagement Means for Jacks.** S. Mandl, assignor to Blackhawk Mfg. Co., both of Milwaukee, Wis.

2,093,371. **Knit Nether Garment.** D. F. Sheehy, assignor to Vanity Fair Silk Mills, both of Reading, Pa.

2,093,440. **Toy.** O. B. Hanson, assignor to Pioneer Rubber Co., both of Willard, O.

2,093,523. **Leather Sole Imitation.** S. Kiyohara, Kobe-Shi, Japan.

2,092,730. **Nursing Unit.** Y. H. Kurkjian, Clifton, N. J.

2,093,906. **Saddle.** J. W. Brandt, assignor to Troxel Mfg. Co., both of Elyria, O.

2,093,908. **Bathing Sandal.** H. M. Dodge, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,093,910. **Surgical Dressing, Etc.** F. J. Farrell, Beccles, England.

2,094,008. **Doll.** A. L. Freedlander, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,094,041. **Cushion.** R. K. Lee, Highland Park, and C. A. Tea, assignors to Chrysler Corp., both of Detroit, all in Mich.

2,094,046. **Electrical Fitting.** C. W. Short, E. Providence, R. I., assignor to United States Rubber Products, Inc., New York, N. Y.

2,094,091. **Footwear.** A. F. Bancroft, W. Newton, Mass.

2,094,223. **Nonskid Tire Chain.** K. T. M. Svensson, Vastervik, Sweden.

2,094,264. **Valve Stem.** J. C. Crowley, Cleveland Heights, assignor to Dill Mfg. Co., Cleveland, both in O.

2,094,279. **Rail Seat.** N. K. Moses, Cuyahoga Falls, assignor of one-half to P. A. Coley, Akron, both in O.

2,094,385. **Elevator Door Operator.** H. H. Vanderzee, assignor to Westinghouse Electric Elevator Co., both of Chicago, Ill.

2,094,499. **Life Preserver.** S. Scavo, Carbondale, Pa.

2,094,536. **Ball Game.** R. Heimers, Mexico, D. F., Mexico.

2,094,629. **Rubber Gasket Coupling.** B. B. Whittam, Akron, O.

2,094,636. **Tire.** A. W. Bull, Grosse Pointe, Mich., assignor to United States Rubber Co., New York, N. Y.

2,094,710. **Nipple Retaining Means.** Y. H. Kurkjian, Clifton, N. J., assignor to J. Schmid, Inc., New York, N. Y.

2,094,717. **Moistureproof Material.** A. R. Olsen, assignor to Hercules Powder Co., both of Wilmington, Del.

2,094,800. **Vehicle Ventilating and Weatherproofing Unit.** W. Lintern, Cleveland, O., assignor, by mesne assignments, to Evans Products Co., Detroit, Mich.

2,094,962. **Manicuring Device.** R. G. Raworth, Providence, R. I.

2,095,412. **Hair Waver.** G. N. Edwards, assignor to Ohio Rubber Co., both of Willoughby, O.

2,095,416. **Joint for Metal Links.** E. B. G. Lefevre, Detroit, Mich.

2,095,489. **Tire.** G. A. Cotton, Hebden Bridge, England.

2,095,543. **Dental Amalgam Container.** P. Doll, Bad Godesberg, Germany.

2,095,668. **Weather Strip.** A. T. Kunkel, Akron, O.

2,095,880. **Overshoe.** L. Koenig, assignor to Woodstock Rubber Co., Ltd., both of Woodstock, Ont., Canada.

2,095,931. **Means for Repairing Sheet Material.** H. T. Kraft, assignor to General Tire & Rubber Co., both of Akron, O.

Dominion of Canada

368,505 and 368,506. **Saddle Seat.** Baldwin Rubber Co., assignee of H. M. Pryale, S. C. Clark, and D. R. Cotterman, co-inventors, all of Pontiac, Mich., U. S. A.

368,569. **Comb.** O. B. Carson, Scarsdale, N. Y., U. S. A.

368,571. **Flexible Conduit.** I. Cowles, Detroit, Mich., U. S. A.

368,577. **Comb.** O. Griffin, Escondido, Calif., U. S. A.

368,608. **Golf Playing Harness.** J. W. L. Webster, Liverpool, England.

368,711. **Comb.** J. Hustler, St. Marys, Ont.

368,740. **Electric Cable.** Canada Wire & Cable Co., Ltd., Leaside, Ont., assignee of General Cable Corp., New York, assignee of R. A. Schatzel, Rome, both in N. Y., U. S. A.

369,029. **Bathing Cap.** F. Brighten, London, England.

369,058 and 369,059. **Undergarment.** P. H. Robbins, New York, N. Y., U. S. A.

369,060. **Wool Holder.** H. M. Robertson, Masterton, New Zealand.

369,109. **Foundation Garment.** H. W. Gossard Co., assignee of H. Wipperman, both of Chicago, Ill., U. S. A.

369,142. **Railway Car Tire.** K. I. L. Andersson and O. G. L. Gustavsson, co-inventors, both of Ljusdal, Sweden.

369,150. **Girdle. S. Davis,** New York, N. Y., U. S. A.

369,241. **Horticultural Binding Tape.** Marathon Paper Mills Co., Rothschild, assignee of A. Abrams and G. W. Forcey, both of Wausau, and C. L. Wagner, Rothschild, co-inventors, all in Wis., U. S. A.

369,306. **Garment Waistband.** A. J. Krein, Baltimore, Md., U. S. A.

United Kingdom

464,621. **Rubber Springs.** Getefo Ges. Fur Technischen Fortschritt.

464,677. **Seats.** D. F. H. Fitzmaurice.

464,811. **Spring Surfaces.** B. S. Davies, Sorbo, Ltd., H. Ambrose, and Len, Ltd.

464,928. **Horseshoes.** B. P. Gray.

465,007. **Paper Bags, Etc.** Pirie, Appleton & Co., Ltd., and H. L. Morbey.

465,074. **Motor Cycles.** A. Aretz.

465,107. **Cutting Dies.** United Shoe Machinery Corp.

465,109. **Respiratory Appliances.** F. J. H. Phillips.
465,187. **Tires.** Matador Gummiwerke A.G.
465,241. **Hose Couplings.** D. Catley.
465,258. **Handles.** Needham, Veall & Tyzack, Ltd., and H. Willey.
465,270. **Handles.** D. J. O'Brien.
455,274. **Suspender Grips.** W. R. Weeks.
465,312. **Pneumatic Sucker Fastenings.** A. E. Shrimpton.
465,355. **Hot Water Bottle Closures.** J. E. Pollak. (Continental Gummi-Werke A.G.)
465,394. **Spring Suspensions.** Getefo Ges. Fur Technischen Fortschritt.
465,398. **Spring Suspensions.** Steel Wheel Corp.
465,485 and 465,486. **Hats.** V. W. Webb.
465,502. **Conductors.** Westinghouse Electric & Mfg. Co.
465,518. **Rugs.** S. Blumenthal & Co., Inc., and L. Mellersh-Jackson.
465,519. **Cushioning Devices.** J. H. Everston.
465,522. **Paper.** A. S. Lowry.
465,542. **Garter Grips.** T. Walker, Ltd., and G. T. Walker.
465,630. **Valve Components.** C. Hall.
465,639. **Tire Treads.** D. S. Kennedy.
465,681. **Infants' Garments.** F. Behringer.
465,683. **Grinding Machines.** Norton Co.
465,716. **Pads.** F. Kohn.
465,724. **Pipe Joints.** C. L. Cowdrey.
465,748. **Elastic Fabrics.** K. Schoppmann.
465,751. **Pocket Igniters.** W. Voss.
465,774. **Shaving Brushes.** R. Tiedemann.
465,922. **Asbestos Cement Mold.** T. F. K. Brown, H. E. Chick, and L. G. Green.
465,940. **Orthopedic Footwear Devices.** H. L. Schweiger.
465,989. **Glove Supports.** F. Lautenschlager.
466,003. **Packages.** F. P. M. Auban.
466,009. **Snap Action Switches.** V. Vild and Skoda Works, Plzen.
466,022. **Joint Making Packing.** Turner & Newall, Ltd., L. A. Turner, and E. G. Latham.
466,028. **Instruments for the Deaf.** Lieber Patents Corp.
466,044. **Floors.** A. F. Dufton, R. Fitzmaurice, and C. J. Morreau.
466,065. **Grinding Wheels.** H. P. Coussement and F. Cappette.
466,084. **Headdresses.** A. Huppertsberg, trading as (firm of) A. Huppertsberg.
466,141. **Helmets.** H. Ryner.
466,147. **Toys.** P. Lund.
466,165. **Steering Gear.** E. B. Boughton.
466,209. **Rollers.** W. E. Taylor and J. Donaghy.
466,224. **Bottle Crates.** J. H. Robins.
466,236. **Powder Puffs.** D. Meyer and Hygienol Co., Inc.
466,260. **Pails.** E. T. Everton, Ltd., and A. S. Bywater.
466,305. **Coating Surfaces.** C. F. and L. Traung, L. H. Jackson, H. W. Johnston, H. T. Gardner, and F. T. Sheedy, trading as Traung Co.
466,341. **Spring Suspensions.** Auto Union A.G.
466,354. **Hinges.** Silentbloc, Ltd., and S. W. Jelley.
466,362. **Corsets.** Kettering Co-operative Corset Society, Ltd., and A. W. Keller.
466,377. **Massage Apparatus.** A. Boudo.
466,385. **Cables.** Siemens & Halske A.G.
466,395. **Vehicles.** J. H. Heywood.
466,408. **Gloves.** L. Gilder.
466,451. **Hats.** D. Rose.
466,468. **Basket Covers.** J. C. Clark.
466,489. **Head Sets.** H. Ryner.
466,556. **Batteries.** Chloride Electrical Storage Co., Ltd.
466,570. **Moving Figure Targets.** F. R. B. Whitehouse and Chad Valley Co., Ltd.
466,590. **Hair Curling Appliances.** A. Burnet.
466,602. **Tennis Ball Fabrics.** Dunlop Rubber Co., Ltd., and G. S. Dolby.
466,610. **Braces.** F. O. Salzmann.
466,645. **Brushes.** M. Samuel.
466,646. **Hinges.** Getefo Ges. Fur Technischen Fortschritt.
466,691. **Golf Practising Appliances.** J. M. Anderson.
466,728. **Seats.** W. H. Sadgrove
466,757. **Resilient Mountings.** E. P. and L. J. Renaux.
466,777. **Finger Stalls.** J. G. Lloyd and H. G. Adams.
466,805. **Artificial Teeth Marker.** L. N. Roebuck and S. J. Everett.
466,975. **Brakes.** Dunlop Rubber Co., Ltd., J. Wright and H. Trevaskis.
466,905. **Envelopes.** W. E. Ellens and J. Dickinson & Co., Ltd.
466,988. **Bracelets.** R. Bakhrakh.
467,042. **Bandages.** H. Ryner.
467,064. **Vehicle Wheels.** Compressed Rubber Products, Ltd., and B. Claremont-Taylor.
467,096. **Tires.** A. C. Stevenson.
467,109. **Cables.** C. F. Moody, and E. A. Mitchell.
467,133. **Hose Tubing.** United States Rubber Products, Inc.
467,164. **Resilient Mountings.** G. Galloni and C. Poggi.
467,180. **Cables.** Callender's Cable & Construction Co., Ltd., and R. S. Vincent.
467,196. **Stuffing Box Substitutes.** M. Preiss.
467,235. **Windscreen Wipers.** E. M. Blanckensee.
467,245. **Reservoir Brushes.** G. Binon.
467,347. **Washing Machines.** J. C. Timpany.
467,384. **Soles and Heels.** W. H. Irons and Padmore & Barnes, Ltd.
467,439. **Hasp Fastenings.** F. H. Rogers. (Deutsche Kuhl-Und Kraftmaschinen-Ges.)
467,444. **Feeding Webs.** K. C. Campbell, J. Gagg, and Molins Machine Co., Ltd.
467,478. **Centrifugal Machines.** Siemens-Schuckertwerke A. G.
467,498. **Road Surface Markings.** M. L. Taylor. (Representative of A. H. Taylor.)
467,506. **Galoshes.** J. H. Liddington.
467,526. **Fibrous Cement.** L. Bille.
467,541. **Mop Wringers.** F. Mullett and M. M. and J. H. Cooling.
467,659. **Surgical Bandages.** R. F. Raven & H. A. Raynor.
467,702. **Soles.** J. H. Stowe.
467,780. **Hinges.** Getefo Ges. Fur Technischen Fortschritt.
467,797. **Electrolytic Cells.** Kodak, Ltd.

Germany

650,450. **Rubber Springs.** George Spencer Moulton & Co., Ltd., and Alexander Spencer, both of London, England. Represented by Fred Mayer, Berlin.
650,685. **Syringe.** Cascadia Products, Ltd., London, England. Represented by F. Herzfeld-Wuesthoff, Berlin.

TRADE MARKS

United States

349,935. **Velva Glow.** Sponges. Brussels & Brawer, New York, N. Y.
349,997. Circle containing representation of a hand and the words: **"Bali Bra"** underneath. Corsets and girdles. Fay-Miss Brassiere Co., Inc., New York, N. Y.
350,035. **Cro*pax.** Arch supports, corn pads, heel cushions, etc. Forest City Rubber Co., Cleveland, O.
350,059. **General.** Storage batteries. General Tire & Rubber Co., Akron, O.
350,110. **R1.** Tires and inner tubes. Goodyear Tire & Rubber Co., Akron, O.
350,144. **Croydon.** Tires and tubes. Sam Schwartz Co., Inc., New Haven, Conn.
350,163. Representation of a box cover containing the representation of a tower and the words: **"Le Transparent Trojan. Youngs Rubber Corporation, Inc., New York. Le Transparent Trojan. Youngs Rubber Corporation, Inc., New York. Le Transparent Trojan."** Prophylactic goods. Youngs Rubber Corp., New York, N. Y.
350,179. **Latex Whip.** Sponge rubber cushions, mattresses, and padding. Firestone Tire & Rubber Co., Akron, O.
350,249. **Herco.** Hose. Hercules Co., Philadelphia, Pa.
350,262. **Evangeline.** Prophylactic goods. A. E. Weisberg, New York, N. Y.
350,266. **Monitor.** Composition sheet material. Bolta Rubber Co., Inc., Lawrence, Mass.
350,332. **Modernized.** Belting, hose, and tires. Johnson Belting Co., New York, N. Y.
350,342. **St. Andrews.** Golf balls. Kasselberg-Griffith Corp., Chicago, Ill.
350,481. **Pioneer.** Erasers. David Kahn, Inc., North Bergen, N. J.
350,574. Representation of a baby pulling his pants. Baby pants. American Latex Corp., New York, N. Y.
350,620. **Goodyear Fashions Afoot.** Footwear. Phillips-Baker Rubber Co., Providence, R. I., assignor to Goodyear Footwear Corp.
350,629. **Lorraine Professional.** Combs. Glemby Co., Inc., New York, N. Y.
350,679. **Minette.** Combs. Bolta Rubber Co., Inc., Lawrence, Mass.
350,720. **Air-Thief.** Hose. A. I. Epton, Chicago, Ill.
350,726. **"Youth-Bra" by Lerner Shops.** Brassieres, garter belts, girdles, etc. Lerner Stores Corp., New York.
350,759. **Duracord.** Rubber composition slabs. Panther-Panco Rubber Co., Inc., Chelsea, Mass.
350,798. **Safti-Flight.** Tires and inner tubes. Fisk Rubber Corp., Chicopee Falls, Mass.
350,824. **Silcon.** Tires. General Tire & Rubber Co., Akron, O.
350,838. **Kaolloid.** Clay filling material. Thompson, Weinman & Co., Inc., Cartersville, Ga.
350,880. **Poiseflex.** Corsets and girdles. Poisefair Co., Inc., New York, N. Y.
350,925. **Mavold by Newman.** Corsets and other foundation garments. I. Newman & Sons, Inc., New Haven, Conn.
350,979. **Wendees.** Footwear. Phillips-Baker Rubber Co., Providence, R. I., assignor to Goodyear Footwear Corp., a corporation of Del.

NEW PUBLICATIONS

"News About du Pont Rubber Chemicals." E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. The application of Neoprene to modern airplanes is discussed in a news letter released October 6, 1937. Six reports were enclosed with the letter:

(1) "Aquarex D and Aquarex F." 8 pages. This report deals with the use of Aquarex D and F in latex processes where they function as pigment dispersing agents, stabilizing agents, and wetting agents. Test data show the effects of these two materials when used as stabilizers and as wetting agents. Aquarex D is also recommended as a model lubricant, cleansing agent for rubber goods, and as a means for preventing adhesion between slabs of uncured rubber.

(2) "Neoprene Compounding Principles. Part IV. Processing." 12 pages. After summarizing the characteristics of unvulcanized Neoprene, this report discusses the operations of mill and Banbury mixing, calendering, extruding, and curing.

(3) "Transparent Rubber." 2 pages. Three compositions are suggested for molded goods "that approach transparency as much as possible." Recommendations are made for curing this type of stock.

(4) "Hard Rubber Sponge." 2 pages. Two compounds are given for hard rubber sponge. Processing details are recommended for these compositions which are adaptable for press curing.

(5) "Accelerator 808 in Clay Stocks." 1 page. Accelerator 808 is absorbed by clays causing a definite retardation in cure. A way to overcome this retardation through the use of a combination of triethanolamine and stearic acid is summarized.

(6) "The Evaluation of Rubber and Rubberlike Compositions as Vibration Absorbers." F. L. Yerzley. 8 pages. This enclosure is a reprint of an article appearing in *Industrial and Engineering Chemistry*, (Anal. Ed.), August 15, 1937. Described in this paper is an apparatus for the automatic recording of measurements to be used in evaluating rubber and rubberlike compositions as vibration absorbers.

"Goodyear Rubber Flooring." Goodyear Tire & Rubber Co., Akron, O. Interesting to architects, contractors, and individuals contemplating new business buildings, dwellings, or remodelling of present structures, is a picture portfolio of rubber flooring installations. Between wire-bound, stiff stock covers in deep crimson, appear 95 engravings covering practically every type of the most common applications of rubber flooring, both of the rubber tile and roll varieties. Only copy in the entire book is confined to a brief description of the product on the first page, the pictures being relied upon to tell their own story throughout the rest of the book, which is 8½ by 11 inches in flat dimensions, approximately three-eighths of an inch thick.

"Permeability of Organic Polysulphide Resins to Hydrogen," by T. P. Sager. National Bureau of Standards, Washington, D. C. 8 pages. The information reported in this leaflet was obtained in a study of the permeability of products resulting from the reaction between organic dihalides and metallic polysulphides. This investigation is of importance in connection with the production of gas-tight balloon and airship fabrics. Data are presented which indicate that lower permeabilities are obtained with reaction products containing four sulphur atoms than those with two sulphur atoms. Comparison with films of natural rubber show that for both the disulphide and tetrasulphide derivatives a much lower permeability is obtained with these products. In the case of fabrics coated with both derivatives, the same relative behavior is indicated.

Further data show the effect of carbon black loading and the permeability to helium. The pamphlet is concluded by a short discussion on the mechanism of permeation. The leaflet, which is listed as Research Paper RP1020, may be obtained for 5¢ from the Superintendent of Documents, Washington, D. C.

"Johns-Manville Industrial Products." Johns-Manville, 22 E. 40th St., New York, N. Y. 64 pages. In this illustrated catalog are described the more important Johns-Manville products which have been designed to eliminate industrial waste, reduce maintenance expense, and provide permanent, fireproof building materials. Among the many products discussed in this booklet are corrugated Transite for roofing and siding, industrial friction materials, Transite pipe for water lines and vents, packings and gaskets, flooring, roofing, and a variety of high and low temperature insulations. Also information is given on Transite electrical conduit, asbestos ebony, and other electrical materials. Of special interest to the rubber industry is the mention of a number of products such as friction materials and packings that contain rubber.

"Sales Scrap Book." Salesmen's League of America, Inc., 118 E. 28th St., New York, N. Y. 64 pages. The October issue of this new magazine for salesmen contains articles by Dale Carnegie, H. Simmons, and a number of others. The purpose of this magazine is to present information, obtained from a variety of sources, of special interest to salesmen. As the magazine is both inspirational and informative, it should be helpful, as a stimulus, to the salesman in his work.

"Bristol's Wide-Strip Pyrometer." The Bristol Co., Waterbury, Conn. 36 pages. This catalog presents an illustrated detailed discussion of the construction and operation of Bristol's wide-strip pyrometers which, although particularly applicable to high-temperature measurement, may also be used for temperature ranges such as encountered in the rubber industry. A description of pertinent auxiliary equipment used in conjunction with these instruments is also included in the bulletin. An insert illustrates sample sections of the wide-strip charts in full 12¼-inch width.

"Wood Scaffolds." Safe Practices Pamphlet No. 12. National Safety Council, 20 N. Wacker Dr., Chicago, Ill. 8 pages. Based on the accident prevention experience of a number of employers, this pamphlet contains 52 safety procedures to follow in the erection and maintenance of wood scaffolds. Among the major principles to be followed in good scaffold practice are selection of proper materials and type of scaffolding, establishing an adequate foundation, and safe maintenance throughout the entire job.

"Preventing Welding and Cutting Fires." Linde Air Products Co., 205 E. 42nd St., New York, N. Y. 16 pages. This booklet sets forth safety rules to follow for preventing the possibility of fire from oxy-acetylene welding or cutting operations. The rules are based on the combined experience of oxy-acetylene equipment users, equipment manufacturers, and members of the National Safety Council, National Fire Protection Association, and International Acetylene Association.

"Commonly Used Solvents." Carbide & Carbon Chemicals Corp., 30 E. 42nd St., New York, N. Y. On the front side of this wall chart, which is constructed of heavy cardboard 26 by 20 inches, are listed in tabular form 100 commonly used solvents with their chemical formulas and important properties. Three evaporation charts on the reverse side show the relative evaporation rates of three classes of solvents: slow to very slow, intermediate to slow, and fast to intermediate evaporating liquids.

"Goodyear Motion Pictures." Goodyear Tire & Rubber Co., Inc., Akron, O. 40 pages. This catalog describes the 34 educational subjects portrayed in silent movies which are available for use without charge by business and professional organizations and educational, religious, fraternal, and recreational groups. Among the film subjects listed are two on rubber plantations and one each on tire, inner tube, and general rubber manufacturing. A number of films depict the building and flying of airships.

Market Reviews

CRUDE RUBBER

Commodity Exchange

TABULATED WEEK-END CLOSING PRICES

Futures	Aug. 28	Sept. 25	Oct. 2	Oct. 9	Oct. 16	Oct. 23
Sept. ...	18.30	18.20	.....	.....	.....	.....
Oct.	18.37	18.17	17.58	16.71	16.04	15.83
Dec.	18.49	18.26	17.73	16.84	16.12	15.88
Mar.	18.68	18.38	17.83	16.98	16.23	15.97
July	18.85	18.57	18.00	17.09	16.32	16.08
Sept. ...	.....	.....	18.07	17.14	16.37	16.15
Volume per week (tons)..	13,520	14,920	20,790	20,790	11,190	24,410

THE Commodity Exchange table published here shows prices of representative future contracts on the New York market during the past two months.

The price for December futures was 18.26¢ per pound on September 25. Since then the market has declined steadily to close at 15.87¢ on October 21. During the past four weeks the maximum variation in prices for delivery during the next year was 0.49¢ per pound. Slightly over 20,000 tons were traded during each of the weeks ending October 2 and 9. A decrease to 11,190 tons was registered for the week ending October 16.

During August net exports from Agreement territories under the restriction scheme amounted to 99,654 tons, and for the second successive month restriction quotas were exceeded. This compares with 101,389 tons exported in July. These export figures indicate that rubber producing countries will have no difficulties in filling this year's quotas.

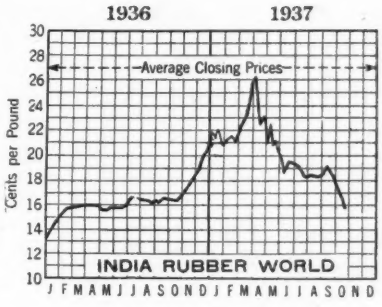
According to Commodity Exchange statistics, all countries of the world with only three minor exceptions have increased their use of rubber during the first eight months of 1937 as compared with the same period in 1936, this increase ranging from 5 to 120%. The increase for the world is 14.3%.

On the following page of this issue are reported United States statistics on imports, consumption, stocks, and crude rubber afloat during September.

New York Outside Market

Factory demand in general was restricted during October with factories disposed to await a further indication of price trends. Shipment business was only on a moderate scale. On September 27 No. 1 ribbed smoked sheets closed at 18¼¢ per pound, after which it declined rather consistently to close at 15$\frac{11}{16}$¢ on October 21.

The week-end closing prices on No. 1 ribbed smoked sheets follow: October 1, 17¾¢; October 9, 16⅞; October 16, 16⅛; October 23, 16.



New York Outside Market—Spot Ribbed Smoked Sheets

New York Quotations

New York outside market rubber quotations in cents per pound

	Oct. 26, 1936	Sept. 27, 1937	Oct. 27, 1937
Plantations			
Rubber latex..*gal.*	62/63	67/68	55/56
Paras			
Upriver fine	21	19	17
Upriver fine	*25	*24	*20¾
Upriver coarse ...	12	11	10½
Upriver coarse ...	*17	*17	*15
Islands fine	21	19	16
Islands fine	*25	*23	*19
Acre, Bolivian fine	21½	19¾	17¼
Acre, Bolivian fine	*26	*24¼	*21
Beni, Bolivian fine	22	19¾	17¾
Madeira fine	21¼	19	17¼
Caucho			
Upper ball	12	11	10¼
Upper ball	*17	*17	*15
Lower ball	11½	10½	10
Pontianak			
Pressed block	10/20	13½/32	16/32
Guayule			
Duro, washed and dried	13¼	14	13½
Ampar	13¾	14½	14
Africans			
Rio Nuñez	15	19	16
Black Kassai	15¼	18½	16
Prime Niger flake.	27½	28	25
Gutta Percha			
Gutta Siak	10½	11½	12
Gutta Soh	14½	22	25
Red Macassar ...	1.10	1.10/1.35	1.05/1.20
Balata			
Block, Ciudad Bolivar	30	30	30
Manaos block	25	28	27
Surinam sheets ..	33	37	37
Amber	38	39	42

*Washed and dried crepe. Shipments from Brazil.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
2370	Supplier of rubber matting stock in 12-foot length 66 inches wide.
2371	Supplier of gutta percha and balata.
2372	Manufacturer of Whitoid, stripping for gaskets, for calking the seams on boats.
2373	Manufacturer of rubber telephone bases.
2374	Supplier of Essar Gum.
2375	Manufacturer of Tirex link mats.
2376	Manufacturer of a machine to clean hydraulic press platens.
2377	Manufacturer of "Rust Eater."
2378	Supplier of cushion gum.
2379	Supplier of raw red rubber for tubes.
2380	Supplier of camel back.
2381	Firms rubberizing fabrics 180 inches in width.
2382	Supplier of Acronae Resin.
2383	Supplier of leather flocks.
2384	Supplier of cold cure rubber cement.
2385	Supplier of benzol.
2386	Supplier of Betonite.
2387	Supplier of Aquagel.
2388	What firm is equipped to cover plating hooks with rubber by the Anode process.

New York Outside Market—Spot Closing Prices—Plantation Grades—Cents per Pound

	September, 1937				October, 1937																		
	27	28	29	30	1	2	4	5	6	7	8	9	11	12*	13	14	15	16	18	19	20	21	22	23
No. 1 Ribbed Smoked Sheet	18¼	18	17¾	17½	17¾	17¾	17⅝	17⅛	17	16¾	16¾	16⅞	16⅛	..	16⅛	16⅜	16½	16⅜	15¾	15⅝	16	15⅞	15⅞	15⅞
No. 2 Ribbed Smoked Sheet	18⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16½	..	16½	16⅞	16⅛	15⅞	15½	15⅜	15¾	15⅝	15⅝	15⅝
No. 3 Ribbed Smoked Sheet	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	17⅛	16⅛	16⅛	16⅛	16⅛	16⅛	16¼	..	16¾	16⅞	16⅛	15⅜	15¼	15⅛	15½	15¼	15¼	15¼
No. 4 Ribbed Smoked Sheet	17⅝	17⅜	17⅛	16⅞	17⅛	17⅛	17	16½	16⅜	16⅜	16⅜	16¼	16⅛	..	16⅛	16	15⅞	15⅜	15	14⅞	15¼	15	15	15
No. 1 Thin Latex Crepe...	19¼	19	18¾	18½	18¾	18¾	18⅝	18⅛	18	17¾	17¾	17⅞	17⅛	..	17⅛	17⅜	17½	17⅛	16¾	16⅝	17	16⅝	16⅝	16⅝
No. 1 Thick Latex Crepe..	19⅜	19⅛	18⅞	18⅝	18⅞	18⅞	18¾	18¼	18⅛	17⅞	17⅞	18	17⅛	..	17⅛	17¾	17⅝	17¼	16⅞	16¾	17⅛	16¾	16¾	16¾
No. 1 Brown Crepe.....	17⅛	16⅞	16⅝	16⅜	16⅝	16⅝	16½	16	15⅞	15⅜	15⅞	16	15⅛	..	15⅛	15¾	15⅝	15¼	14⅞	14¾	15⅛	15	15	15
No. 2 Brown Crepe.....	17	16¾	16½	16¼	16½	16½	16⅜	15⅞	15¾	15¾	15¾	15⅞	15⅛	..	15⅛	15⅝	15½	15⅛	14¾	14⅝	15	14⅞	14⅞	14⅞
No. 2 Amber.....	17⅛	16⅞	16⅝	16⅜	16⅝	16⅝	16½	16	15⅞	15⅞	15⅞	16	15⅛	..	15⅛	15¾	15⅝	15¼	14⅞	14¾	15⅛	15	15	15
No. 3 Amber.....	17	16¾	16½	16¼	16½	16½	16⅜	15⅞	15¾	15¾	15¾	15⅞	15⅛	..	15⅛	15⅝	15½	15⅛	14¾	14⅝	15	14⅞	14⅞	14⅞
No. 4 Amber.....	16½	16¼	16	15¾	16	16	15⅞	15⅜	15¼	15¼	15¼	15⅜	15⅛	..	15⅛	15⅜	15	14⅝	14⅛	14⅛	14½	14⅜	14⅜	14⅜
Rolled Brown.....	14½	14¼	14	13¾	14	14	13⅞	13⅜	13¼	13¼	13¼	13⅜	13⅛	..	13⅛	13⅜	13	12⅝	12¼	12⅛	12½	12⅜	12⅜	12⅜

*Holiday.

IMPORTS, CONSUMPTION, AND STOCKS

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Imports* Tons	U. S. Consumption¶ Tons	U. S. Stocks Mfgrs. Importers, Dealers, Etc.† Tons	U. S. Stocks Afloat† Tons	U. K.— Public Warehouses, London, Liverpool†‡ Tons	Singapore and Penang Dealers and Port Stocks†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks†‡§ Tons
1934	469,484	453,223	355,000	47,644	134,927	62,142	1,019,100	921,141	735,391
1935	448,116	491,544	303,000	39,094	164,295	28,304	872,600	937,489	643,170
1936	490,858	575,000	223,000	56,567	78,462	26,969	855,638	1,044,776	459,565
1937									
January ...	32,820	50,818	204,201	55,096	71,062	36,365	71,544	92,926	414,690
February ..	43,289	51,887	195,080	53,538	63,760	42,132	70,535	93,042	399,585
March	52,039	54,064	191,928	56,994	52,077	42,485	102,441	104,696	437,271
April	35,850	51,797	174,934	72,530	48,748	38,812	89,608	93,566	391,015
May	50,840	51,733	172,985	58,542	46,628	34,234	87,030	101,245	375,051
June	48,956	51,798	169,646	57,215	43,427	45,085	96,111	102,042	403,121
July	39,108	43,650	164,445	75,779	42,175	44,776	112,262	90,378	397,194
August ...	48,785	41,456	171,052	80,439	45,211	47,886	102,232	90,126	405,426
September..	56,049	43,893	182,556	83,288	.....	.....	.....	.....	.....

*Including liquid latex. †Stocks on hand the last of the month or year. ‡Statistical Bulletin of the International Rubber Regulation Committee. §Stocks at U. S. A., U. K., Singapore and Penang, Para, Manaos, and afloat. ¶Corrected to 100% from estimate of reported coverage. **Not including additional absorption from U.K. manufacturers' stocks for any month during 1936. The figure will be included in yearly total.

RUBBER SCRAP

THE demand for all grades of rubber scrap is holding fairly steady, and reclaimers are still working at full capacity. An increase in activity is expected as a result of the requirements of the new 1938 automobile models.

The market is somewhat easier as is reflected by the decline in prices on some grades since last month. No. 1 floating inner tubes receded 1¢ per pound; while other tubes dropped from ⅜ to ¾¢. Auto tire carcass declined $4 per ton with the high at $25. No. 1 red mechanical scrap is off ½¢ per pound, and white druggists' sundries declined ¼ to ½¢. All other standard grades remained the same as on September 24.

CONSUMERS' BUYING PRICES

(Carload Lots Delivered Eastern Mills)

October 22, 1937

		Prices
Boots and Shoes		
Boots and shoes, black	lb.	$0.01¼/$0.01⅜
Colored	lb.	.00⅞/ .01
Untrimmed arctics	lb.	.01 / .01⅛
Inner Tubes		
No. 1, floating	lb.	.12 / .13
No. 2, compound	lb.	.05½/ .05¾
Red	lb.	.05¼/ .05½
Mixed tubes	lb.	.05 / .05¼
Tires (Akron District)		
Pneumatic Standard		
Mixed auto tires with beads	ton	14.50 /15.50
Beadless	ton	21.50 /22.00
Auto tire carcass	ton	24.00 /25.00
Black auto peelings	ton	24.00 /26.00
Solid		
Clean mixed truck	ton	31.00 /32.00
Light gravity	ton	42.00 /43.00
Mechanicals		
Mixed black scrap	ton	25.00 /27.50
Hose, air brake	ton	29.00 /31.00
Garden, rubber covered	ton	14.00 /15.00
Steam and water, soft	ton	14.00 /15.00
No. 1 red	lb.	.03½/ .03¾
No. 2 red	lb.	.02¾/ .03
White druggists' sundries	lb.	.04¼/ .04½
Mechanical	lb.	.02½/ .03
Hard Rubber		
No. 1 hard rubber	lb.	.14½/ .15½

CRUDE rubber consumption by United States manufacturers in September is estimated at 43,893 long tons, against 41,456 long tons during August, a 5.9% increase, and is 5.5% under the 46,449 (revised) long tons consumed in September, 1936, reports the R.M.A.

Gross imports of crude rubber for September are reported to be 56,049 long tons, an increase of 14.9% over the August figure of 48,785 long tons and 15.8% over the 48,386 long tons imported in September, 1936.

Total domestic stocks of crude rubber on hand September 30 are estimated at 182,556 long tons, compared with August 31 stocks of 171,052 long tons and 233,336 (revised) long tons on hand September 30, 1936.

Crude rubber afloat to United States ports as of September 30 is figured at 83,288 long tons, which compares with 80,439 long tons afloat on August 31 and 62,240 long tons afloat on September 30 a year ago.

Book Reviews

(*Continued from page* 74)

ciety for Chemical Engineering, contains eight monographs. Three of these, dealing with research in chemical engineering, cover the following topics: "Cooperation between Chemist and Engineer," "Extraction of Liquids and Gases with Liquids," and "Physical Principles, Problems, and Present Status of Filtration." Four monographs on "Electrothermics in Chemical Technics" deal with "Problem and Present Status of Application of Electrothermics in Chemical Industry," "Selection of Working Material for Generation of Electrical Heat," "Electro-Control of Temperature," and "External and Internal Electrical Heating of Apparatus made from Quartz, with Special Consideration given to Internal Heating by Immersion of Heating Tubes." These seven treatises were originally presented as lectures at the tenth general meeting of Dechema at Munich in 1936. The final monograph in this volume, on "Separation of Gases as the Cause of the Filtration-Effect," represents work done by W. Mehner at the Technological College of Karlsruhe. A general index for all nine volumes concludes the book.

Pressure Controller

(*Continued from page* 58)

pounds' pressure, and is sensitive to ¼-pound pressure change. The case, consisting of a cover and base, is made of sand cast special aluminum. The base casting is drilled for air passages to all connections, with no pipe or tubing inside the case. The unit is furnished with three gages to indicate operations such as initial air pressure, pressure required to operate the diaphragm valve, and indication of pressure under control. Adjustments can be made without interrupting the pressure going to the vessel on which it is used. This controller is especially adapted for rubber vulcanizers and platen presses. Industrial Instrument Co.

Water Repellent

A new chemical, when applied to a textile fabric, will impart a water-repellent finish of extreme softness which will last throughout the useful life of the fabric. This new product, known as "Du Pont Permanent Water Repellent," is a development of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., and will be available soon to textile finishers. The fabric is treated with a water solution of the chemical; then it is dried at moderate temperatures and heated at about 250° F. for a short time. As severe laundering is required in the process of application it is practicable to use this finish only on fabrics dyed with fast colors or on undyed fabrics. The finish leaves the pores of the fabric open, permitting "breathing."

Lead Press Hose Construction?

A reader inquires as to the best type and construction of hose or tubing for conducting gas and air to lead press burners. He states that apparently there is no uniform practice as in his 37 years in the mechanical rubber business he has had a great many inquiries from consumers regarding the best type, and in his discussion with various rubber manufacturers no satisfactory answer or similarity of answers has been obtained. He believes that a discussion through these columns might lead to a standardization of this practice. We will be glad to publish any suggestions submitted.

ADVERTISING PAGES REMOVED

COMPOUNDING INGREDIENTS

IN THE face of the occurring extension of summer inactivity, producers are optimistic, and in general an increased rate of business is predicted for this month.

CARBON BLACK. Sales movements continued slow, and because of the heavy production of tires during the early part of the year some marketers do not expect a large volume of business during the final quarter. Other quarters express more optimism in regard to the tire industry demand. As most of the new carbon black plants are now producing, not much further increase in production is expected. Prices continue steady at the levels in force all year.

FACTICE OR RUBBER SUBSTITUTE. Demand has been lower, but normal activity is expected this month.

LITHARGE. The decline in the price of pig lead resulted in four ¼¢ per pound reductions for litharge since September 27.

LITHOPONE. Manufacturers reported a slow market for this time of the season. Prices have remained unchanged since the latter part of September when prices for red and yellow cadmium lithopones were advanced.

RUBBER CHEMICALS. The demand for accelerators and antioxidants has been lower than earlier in the year, but there are indications of improvement. The prices of these materials remain unchanged.

RUBBER SOLVENTS. These solvents have continued to move toward consumption relatively better than some of the other petroleum solvents, but tire manufacturers have not been buying so heavily as earlier in the year. Prices continue unchanged at the same levels.

STEARIC ACID. Business lacked snap, but a fairly active demand was noted at times, and there were reports of a somewhat better inquiry. Selling schedules were lowered ½¢ per pound.

TITANIUM PIGMENTS. These pigments were favored with a fair demand, but the activity was not brisk. Prices held at schedule. Although definite statistics on the production of titanium pigments in Germany are not available, considerable expansion of output is indicated by the marked gains in imports of ilmenite into Germany from Norway.

ZINC OXIDE. Business was light during the past month, with only mild purchasing reported. There has been no change in price schedules since the increases in the middle of September.

New York Quotations

October 25, 1937

Prices Not Reported Will Be Supplied on Application

Abrasives

Pumicestone, powdered	lb.	$0.03	/$0.03½
Rottenstone, domestic	lb.	.03	/ .03½
Silica, 15	ton	38.00	

Accelerators, Inorganic

Lime, hydrated, l.c.l., New York	ton	20.00	
Litharge (commercial)	lb.	.07½/	.08

Accelerators, Organic

A-1	lb.	.26	
A-5-10	lb.	.34	
A-10	lb.	.34	
A-11	lb.	.57	
A-19	lb.	.57	
A-32	lb.	.72	
A-77	lb.	.47	
A-100	lb.	.47	
A-433	lb.	.50	
Accelerator 49	lb.	.42	
808	lb.		
833	lb.		
Acrin	lb.		
Aldehyde ammonia	lb.		
Altax	lb.		
B-J-F	lb.		
Beutene	lb.		
Butyl Zimate	lb.		
C-P-B	lb.		
Captax	lb.		
Crylene	lb.		
Paste	lb.		
D-B-A	lb.		
Di-Esterex	lb.		
Di-Esterex-N	lb.		
DOTG	lb.	.47	
D.O.T.T.U.	lb.		
DPG	lb.	.37	
El-Sixty	lb.	.57	
Ethylideneaniline	lb.		
Formaldehyde P.A.C.	lb.		
Formaldehydeaniline	lb.		
Formaldehyde-para-toluidine	lb.		
Guantal	lb.	.40	/ .50
Hepteen	lb.		
Base	lb.		
Hexamethylenetetramine	lb.		
Lead oleate, No. 999	lb.	.14	
Witco	lb.	.15	
Methylenedianilide	lb.		
Monex	lb.		
Novex	lb.		
O. N. V.	lb.		
Ovac	lb.		
Pip-Pip	lb.	2.50	
Pipsolene	lb.	1.80	
R-2	lb.	1.70	
Base	lb.	3.65	
R-23	lb.	.57	
R & H 50-D	lb.		
Safex	lb.		
Super-sulphur No. 1	lb.		
No. 2	lb.		
Tetrone A	lb.		
Thiocarbanilide	lb.		
Thionex	lb.		
Trimene	lb.		
Base	lb.		
Triphenyl guanidine (TPG)	lb.		
Tuads	lb.		
Ureka	lb.	$0.65	
Blend B	lb.	.65	
C	lb.	.60	
Vulcanex	lb.		
Vulcanol	lb.		
Vulcone	lb.		
Z-B-X	lb.		
Z-88-P	lb.	.51	
Zenite	lb.		
A	lb.		
B	lb.		
Zimate	lb.		
ZML	lb.		

Activator

Barak	lb.		

Age Resisters

AgeRite Alba	lb.		
Exel	lb.		
Gel	lb.		
Hipar	lb.		
HP	lb.		
Powder	lb.		
Resin	lb.		
D	lb.		
Syrup	lb.		
White	lb.		
Akroflex C	lb.		
Albasan	lb.		
Antox	lb.		
B-L-E	lb.		
B-X-A	lb.		
Copper Inhibitor X-872	lb.		
Flectol B	lb.	.54	
H	lb.	.54	
White	lb.	1.00	
M-U-F	lb.		
Neozone (standard)	lb.		
A	lb.		
C	lb.		
D	lb.		
E	lb.		
Oxynone	lb.	.68	
Parazone	lb.		
Perflectol	lb.	.67	
Permalux	lb.		
Santoflex A	lb.		
B	lb.	.54	
Solux	lb.		
Thermoflex	lb.		
A	lb.		
V-G-B	lb.		

Alkalies

Caustic soda, flake, Columbia (400 lb. drums)	100 lbs.	2.70	/$3.30
liquid, 50%	100 lbs.	1.95	
solid (700 lb. drums)	100 lbs.	2.30	/ 3.05

Antiscorch Materials

A-F-B	lb.		
Antiscorch T	lb.		
Cumar RH	lb.	.09	
R-17 Resin (drums)	lb.	$0.10	
Retarder B	lb.		
W	lb.		
T-J-B	lb.		
U.T.B.	lb.		

Antisun Materials

Heliozone	lb.		
Sunproof	lb.		

Brake Lining Saturant

B. R. T. No. 3	lb.	.0165/$0.0175	

Colors

BLACK

Lampblack (commercial)	lb.	.15	

BLUE

Brilliant	lb.		
Prussian	lb.	.37½	
Toners	lb.	.08	/ 3.85

BROWN

Mapico	lb.	.13	

GREEN

Brilliant	lb.		
Chrome, light	lb.		
medium	lb.		
oxide (freight allowed)	lb.	.21	
Dark	lb.		
Guignet's, Easton, Pa., bbls.	lb.	.70	
Light	lb.		
Toners	lb.	.85	/ 3.75

ORANGE

Lake	lb.		
Toners	lb.	.40	/ 1.60

ORCHID

Toners	lb.	1.50	/ 2.00

PINK

Toners	lb.	1.50	/ 4.15

PURPLE

Permanent	lb.		
Toners	lb.	.60	/ 2.10

RED

Antimony			
Crimson, 15/17%	lb.	.45	
R. M. P. No. 3	lb.	.48	
Sulphur free	lb.	.50	
R.M.P.	lb.	.52	
Golden 15/17%	lb.	.28	
7-A	lb.	.37	
Z-2	lb.	.23	
Aristi	lb.	1.75	
Cadmium, light (400 lb. bbls.)	lb.	.76	/ .81
Chinese	lb.		
Crimson	lb.		
Mapico	lb.	.09¼	
Medium	lb.		
Rub-Er-Red, Easton, Pa., bbls.	lb.	.09¼	
Scarlet	lb.		
Toners	lb.	.08	/ 2.00

WHITE

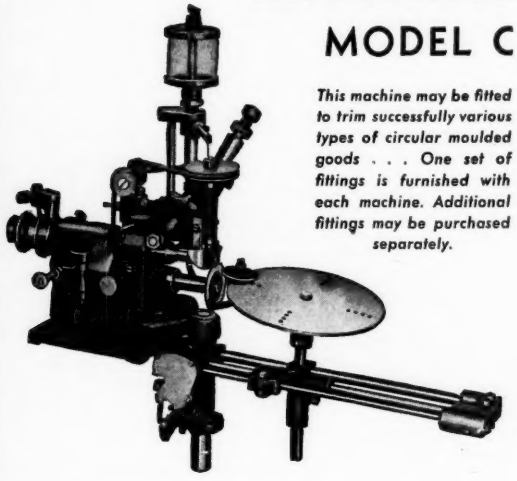
Lithopone (bags)	lb.	.04½/	.04½

Albalith Black Label-11	lb.	$0.04½	/$0.04½
Astrolith	lb.	.04½	/.04½
Azolith	lb.	.04½	/.04½
Cryptone-19	lb.	.05¾	/.06½
CB-21	lb.	.05¾	/.06½
ZS No. 20	lb.	.09	/.09¼
No. 86	lb.	.09	/.09¼
Sunolith	lb.	.04½	/.04½
Ray-Bar	lb.		
Ray-Cal	lb.		
Rayox	lb.		
Titanolith (5-ton lots)	lb.	.05¾	/.06½
Titanox-A (50-lb. bags)	lb.	.16	/.16¾
B (50-lb. bags)	lb.	.05¾	/.06½
B-30 (50-lb. bags)	lb.	.05¾	/.06½
C (50-lb. bags)	lb.	.05¾	/.06½
Ti-Tone	lb.		
Zinc Oxide			
Anaconda, Green Seal			
No. 333	lb.	.08	/.08½
Lead Free No. 352	lb.	.07½	/.08
No. 570	lb.	.07½	/.08
No. 577	lb.	.07½	/.08
Red Seal No. 222	lb.	.07½	/.08
U.S.P. No. 777 (bbls.)	lb.	.09½	/.09¾
White Seal No. 555	lb.	.08½	/.09
Azo ZZZ-11	lb.	.06¼	/.06½
44	lb.	.06¼	/.06½
55	lb.	.06¼	/.06½
66	lb.	.06¼	/.06½
French Process, Florence White Seal-7 (bbls.)	lb.	.08¾	/.08¼
Green Seal-8	lb.	.08	/.08¼
Red Seal-9	lb.	.07½	/.07¾
Kadox, Black Label-15	lb.	.06½	/.06¾
Blue Label-16	lb.	.06½	/.06¾
Red Label-17	lb.	.06½	/.06¾
No. 25	lb.	.07½	/.07¾
Horse Head Special 3	lb.	.06¼	/.06½
XX Red-4	lb.	.06¼	/.06½
23	lb.	.06¼	/.06½
72	lb.	.06¼	/.06½
78	lb.	.06¼	/.06½
80	lb.	.06¼	/.06½
103	lb.	.06½	/.06¾
110	lb.	.06½	/.06¾
St. Joe (lead free)			
Black Label	lb.	.06¼	/.06½
Green Label	lb.	.06¼	/.06½
Red Label	lb.	.06¼	/.06½
U.S.P.	lb.	.09½	/.09¾
White Jack	lb.	.09	/.09¼
YELLOW			
Cadmolith (cadmium yellow), 400 lb. bbls.	lb.	.51	/.56
Lemon	lb.		
Mapico	lb.	.09½	
Toners	lb.	2.50	
Dispersing Agents			
Bardol	lb.	.0215	/.024
Darvan	lb.		
Nevoll (drums)	lb.	.0215	/.024
Santomerse	lb.	.13	
Fillers, Inert			
Asbestine, c.l., f.o.b. mills	ton	15.00	
Barytes	ton	30.00	/36.00
f.o.b. St. Louis (50 lb. paper bags)	ton	22.85	/23.05
off color, domestic	ton	20.00	/25.00
white, imported	ton	29.00	/32.00
Blanc fixe, dry, precip.	lb.	.03½	.05
Calcene	ton	37.50	/45.00
Infusorial earth	lb.	.02	/.03
Kalite No. 1	ton		
No. 3	ton		
Magnesia, calcined, heavy	lb.	.04	
Carbonate L.C.L.	lb.	.07	/.09
Pyrax	ton		
Whiting			
Columbia Filler	ton	9.00	/14.00
Domestic	100 lbs.		
Guilders	100 lbs.		
Hakuenka	lb.		
Paris white, English cliff-stone	100 lbs.		
Southwark Brand, Commercial	100 lbs.		
All other grades	100 lbs.		
Suprex, white extra light	ton	45.40	/60.00
heavy	ton	45.40	/60.00
Witco, c.l.	ton	7.00	
Fillers for Pliability			
P-33	lb.		
Thermax	lb.		
Velvetex	lb.	.03	/.04½
Finishes			
IVCO lacquer, clear	gal.	2.15	/2.50
colors	gal.	2.60	/4.70
Rubber lacquer, clear	gal.		
colored	gal.		
Starch, corn, pwd.	100 lbs.		
potato	lb.		
Talc	ton	25.00	/45.00
Flock			
Cotton flock, dark	lb.	.12	/.13
dyed	lb.	.50	/.85
white	lb.	.14½	/.20
Rayon flock, colored	lb.	1.25	/2.00
white	lb.	1.00	/1.25
Latex Compounding Ingredients			
Accelerator 85	lb.		
89	lb.		
122	lb.		
552	lb.		
Aerosol	lb.	$0.45	
Antox, Dispersed	lb.		
Aquarex A	lb.		
D	lb.		
F	lb.		
Areskap No. 50	lb.	.20	
No. 100, dry	lb.	.43	
Aresket No. 240	lb.	.18	
No. 250, alcoholic	lb.	.22	
No. 300, dry	lb.	.46	
Aresklene No. 375	lb.	.40	
No. 400, dry	lb.	.56	
Black No. 25, Dispersed	lb.	.22	/$0.40
Catalpo	ton		
Color Pastes, Dispersed	lb.		
Dispersex No. 15	lb.	.11	/.12
No. 20	lb.	.08	/.10
Emo, brown	lb.	.16	
white	lb.	.16	
Factice Compound, Dispersed	lb.	.40	
Heliozone, Dispersed	lb.		
Igepon A	lb.		
MICRONEX, Colloidal	lb.	.06	/.07
Nekal BX (dry)	lb.		
Palmol	lb.	.10	
Paradors	lb.		
R-23	lb.	.57	
S.1 (400 lb. drums)	lb.	.65	
Santomerse	lb.	.13	
Stablex A	lb.	.90	/1.10
B	lb.	.65	/.90
C	lb.	.40	/.50
Sulphur, Dispersed	lb.	.10	/.15
No. 2	lb.		
T.1. (400 lb. drums)	lb.	.40	
Tepidone	lb.		
Vulcan Colors	lb.		
Zinc oxide, Colloidal	lb.		
Dispersed	lb.	.12	/.15
Mineral Rubber			
B. R. C. No. 20	lb.	.009	/.01
Black Diamond	ton	25.00	
Genasco Hydrocarbon, granulated, (fact'y)	ton		
solid	ton		
Gilsonite Hydrocarbon (factory)	ton		
Hydrocarbon, hard	ton		
soft	ton		
Parmr Grade 1	ton	25.00	
Grade 2	ton	25.00	
Pioneer	ton		
265°	ton		
Mold Lubricants			
Lubrex	lb.	.25	/.30
Mold Paste	lb.	.18	
Sericite	ton	65.00	/75.00
Soapbark	lb.		
Soapstone	ton	25.00	/35.00
Oil Resistant			
AXF	lb.		
Reclaiming Oils			
B. R. V.	lb.	.03	/.0325
S. R. O.	lb.	.0175	/.0185
Reenforcers			
Carbon Black			
Aerfloted Arrow Specification Black	lb.	.0535	/.0825
Arrow Compact Granulized Carbon Black	lb.		
"Certified" Heavy Compressed, Cabot	lb.		
Spheron	lb.		
Continental Dustless	lb.	.0445	/.0535
Compressed c.l.	lb.	.0445	/.0535
Uncompressed, c.l.	lb.	.0445	/.0535
Disperso, c.l.	lb.	.0445	/.0535
Dixie, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock, bags, delivered	lb.	.07½	
Dixiedensed, c.l., f.o.b., New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock, bags, delivered	lb.	.07½	
Dixiedensed 66, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock, bags, delivered	lb.	.07½	
Excello, c.l., f.o.b. Gulf ports	lb.	.0445	/.0645
delivered New York	lb.	.0505	/.0705
l.c.l., delivered New York	lb.	.07	/.09
Fumonex, c.l., f.o.b. works	lb.	.03	
ex-warehouse	lb.	.04½	
Gastex	lb.	.03	/.07
Kosmobile, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	$0.0535	
local stock, bags, delivered	lb.	.07½	
Kosmobile 66, c.l., f.o.b New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock, bags, delivered	lb.	.07½	
Kosmos, c.l., f.o.b. New Orleans, La., Galveston or Houston, Tex.	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local stock, bags, delivered	lb.	.07½	
MICRONEX Beads, c.l., f.o.b. Gulf ports	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local, stock, bags, delivered	lb.	.07½	
Mark II, c.l., f.o.b. Gulf ports	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local, stock, bags, delivered	lb.	.07½	
Standard, c.l., f.o.b. Gulf ports	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local, stock, bags, delivered	lb.	.07½	
W-5, c.l., f.o.b., Gulf ports	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local, stock, bags, delivered	lb.	.07½	
W-6, c.l., f.o.b., Gulf ports	lb.	.0445	
c.l., delivered New York	lb.	.0535	
local, stock, bags, delivered	lb.	.07½	
Paradene No. 2 (drums)	lb.	.04	
Pelletex	lb.	.03	/$0.07
Supreme, c.l., f.o.b. Gulf ports	lb.	.0445	/.0645
delivered New York	lb.	.0505	/.0705
l.c.l. delivered New York	lb.	.07	/.09
"WYEX BLACK"	lb.		
Carbonex	lb.	.029	/.0315
Carbonex "S"	lb.	.0315	/.034
Clays			
Aerfloted Paragon (bulk)	ton	6.50	
Suprex No. 1 Selected	ton	10.00	
No. 2 Standard	ton	9.00	
China	ton	17.50	/20.00
Dixie	ton		
Junior	ton		
McNamee	ton		
Par	ton		
Witco, f.o.b. Works	ton	9.00	
Cumar EX	lb.	.035	
Reodorants			
Amora A	lb.		
B	lb.		
C	lb.		
D	lb.		
Curodex 19	lb.	2.75	
188	lb.	3.50	
198	lb.	4.50	
Paradors	lb.		
Rodo No. 0	lb.		
No. 10	lb.		
Rubber Substitutes			
Black	lb.	.07¾	/.13¼
Brown	lb.	.08½	/.14
White	lb.	.09½	/.15¼
Factice			
Amberex	lb.	.20	
Brown	lb.	.09	/.16
Neophax A	lb.	.13	
B	lb.	.135	
Fac-Cel B	lb.	.18	
C	lb.	.18	
White	lb.	.10	/.17
Softeners			
Burgundy pitch	lb.	.06	
Cycline oil	gal.	.20	
Nuba Resinous pitch (drums)			
Grades No. 1 and No. 2	lb.	.03	
Grade No. 3	lb.	.04	
Palm oil (Witco), c.l.	lb.	.0575	
Pine tar	gal.		
Plastogen	lb.		
Plastone	lb.	.30	/.35
R-19 Resin (drums)	lb.	10	
R-21 Resin (drums)	lb.	.10	
Reogen	lb.		
Rosin oil, compounded	gal.	.40	
RPA No. 1	lb.		
No. 2	lb.		
Rubtack	lb.	.10	
Tackol	lb.	.115	
Tonox	lb.	.16	
Powder	lb.		
Witco No. 20	gal.	.20	
X-1 Resinous oil (tank car)	lb.	.015	

(Continued on page 90)

USMC TRIMMING MACHINE

MODEL C

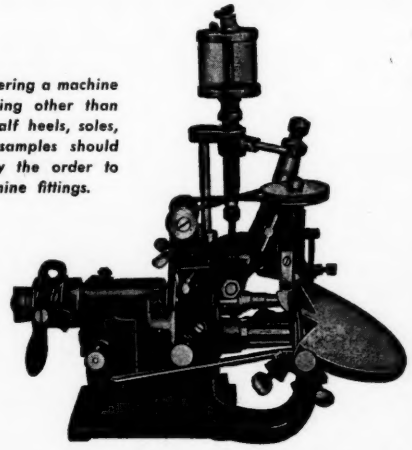


This machine may be fitted to trim successfully various types of circular moulded goods . . . One set of fittings is furnished with each machine. Additional fittings may be purchased separately.

A new and improved machine for trimming the overflow on all types of moulded rubber heels, soles, taps, and miscellaneous moulded rubber goods of similar construction.

Oil is the standard means of lubrication. A water tank is shipped, only when specifically ordered, at an extra charge.

When ordering a machine for trimming other than regular half heels, soles, or taps, samples should accompany the order to determine fittings.



UNITED SHOE MACHINERY CORPORATION

140 Federal Street, Boston, Mass.

Atlanta, Ga., 29½ Pryor St., N.E.
Auburn, Maine.....108 Court
Brockton, Mass.....93 Centre
Chicago, Ill..500 South Franklin
Cincinnati, O..407 East Eighth
Haverhill, Mass.....145 Essex
Johnson City, N. Y...276 Main
Lynn, Mass.....525 Union
Milwaukee, Wis.922 No. Fourth
New York, N. Y.110 Fifth Ave.
Philadelphia, Pa..221 No. 13th
Rochester, N. Y.....130 Mill
St. Louis, Mo.....1423 Olive
San Francisco, Calif.....859 Mission
Worcester, Mass.....71 Mechanic

Regular and Special Constructions

of

COTTON FABRICS

Single Filling Double Filling

and

ARMY

Ducks

HOSE and BELTING

Ducks

Drills

Selected

Osnaburgs

Curran & Barry

320 BROADWAY

NEW YORK

COTTON AND FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

Futures	Aug. 28	Sept. 25	Oct. 2	Oct. 9	Oct. 16	Oct. 23
Sept.	9.45	....	....	....	....	....
Oct.	9.50	8.39	8.32	8.15	....	....
Dec.	9.45	8.25	8.18	7.92	8.32	8.14
Mar.	9.61	8.33	8.12	7.75	8.30	8.09
July	9.73	8.54	8.23	7.85	8.30	8.09
Sept.	....	....	....	....	8.36	8.15

New York Quotations

October 25, 1937

Drills		
38-inch 2.00-yard	yd.	$0.12⅜
40-inch 3.47-yard		.07½
50-inch 1.52-yard		.16¾
52-inch 1.85-yard		.13½
52-inch 1.90-yard		.13¼
52-inch 2.20-yard		.12
52-inch 2.50-yard		.10¾
59-inch 1.85-yard		.13¾
Ducks		
38-inch 2.00-yard D. F.	yd.	$0.12 /.12½
40-inch 1.45-yard S. F.		.17¼
51½-inch 1.35-yard D. F.		.17
72-inch 1.05-yard D. F.		.24¾/.26½
72-inch 17.21-ounce		.29¾
Mechanicals		
Hose and belting	lb.	.26½
Tennis		
52-inch 1.35-yard	yd.	.18½
Hollands		
Gold Seal and Eagle		
20-inch No. 72	yd.	.10
30-inch No. 72		.18
40-inch No. 72		.20
Red Seal and Cardinal		
20-inch	yd.	.08½
30-inch		.15¾
40-inch		.17
50-inch		.25
Osnaburgs		
40-inch 2.34-yard	yd.	.10¼
40-inch 2.48-yard		.09⅝
40-inch 2.56-yard		.09¼
40-inch 3.00-yard		.08
40-inch 7-ounce part waste		.07¼
40-inch 10-ounce part waste		.10⅜
37-inch 2.42-yard		.09⅛
Raincoat Fabrics		
Cotton		
Bombazine 60 x 64	yd.	.07¾
Plaids 60 x 48		.11¼
Surface prints 60 x 64		.12¼
Print cloth, 38½-inch, 60 x 64		.04⅞
Sheetings—40-Inch		
48 x 48, 2.50-yard	yd.	.08¼
64 x 68, 3.15-yard		.08
56 x 60, 3.60-yard		.07
44 x 40, 4.25-yard		.05¼
Sheetings, 36-Inch		
48 x 48, 5.00-yard	yd.	.04½
44 x 40, 6.15-yard		.03½
Tire Fabrics		
Builder		
17¼ ounce 60" 23/11 ply Karded peeler	lb.	.29½
Chafer		
14 ounce 60" 20/8 ply Karded peeler	lb.	.29½
9¼ ounce 60" 10/2 ply Karded peeler	lb.	.28½
Cord Fabrics		
23/5/3 Karded peeler, 1 1/16" cotton	lb.	.30½
15/3/3 Karded peeler, 1 1/16" cotton	lb.	.28½
23/5/3 Karded peeler, 1¼" cotton	lb.	.35
23/5/3 Combed Egyptian	lb.	.49
Leno Breaker		
8¼ ounce and 10¼ ounce 60" Karded peeler	lb.	.31½

THE accompanying table of week-end closing prices on the New York Cotton Exchange shows the week-end change of representative futures during October and closing prices for August 28 and September 25.

Closing at 8.62¢ per pound on September 27, the New York spot middling price fluctuated rather nervously between 8.78¢ and 8.30¢ per pound to close on October 21 at 8.52¢. One exception to this range occurred on October 8 with a price drop for a day to 8.05¢ when the Government Crop Reporting Board estimated the production at 17,573,000 bales, up 1,475,000 bales from September's report. The top price of 8.78¢ on October 13 followed the President's indication that rather drastic curtailment will be urged for next year.

Sales at 13 southern markets amounted to 954,800 bales during 15 days since September 25 as compared with 1,075,800 bales for the same days in 1936. During the last days of September and first of October heavy sales were reported, but recently dull trading conditions have prevailed, with mills buying little cotton, and the export demand poor.

On October 4 the Commodity Credit Corp. broadened its loan plan in order to include cotton of lower grade and shorter staple. The three additions in the loan plan were announced as follows: 8½¢ per pound on cotton ⅞-inch and above in staple and strict low middling or equivalent in grade; 7¢ per pound on cotton shorter than ⅞-inch, grading strict low middling or equivalent in grade; 6¢ per pound on cotton shorter than ⅞-inch, low middling or equivalent in grade.

Consumption of all cotton in domestic mills during September amounted to 601,837 bales as compared with 604,380 bales in August, according to the Census Bureau's report. In September, 1936, consumption totaled 629,767 bales.

Fabrics

The cotton goods market became active again during the latter part of October. The large volume of business transacted recently was regarded as an indication that prices have reached bottom levels. Activity is expected to broaden and extend into the first quarter of next year.

In general prices were somewhat easier: Tire fabric prices were off 1¢ per pound with the exception of 23/5/3 Karded peeler, which remained unchanged. Hollands receded 1¢ to 2¼¢ per yard. Sheeting prices fell off ⅛ to 1¢ per yard, and raincoat fabrics declined ¼ to ½¢ per yard. Some reductions were also registered on the prices of ducks, drills, and osnaburgs.

RECLAIMED RUBBER

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption†	Consumption % to Crude	U. S. Stocks*	Exports
1935	122,140	113,530	22.9	25,069	5,383
1936	150,571	141,486	24.6	19,000	7,085
1937					
January	15,129	14,450	28.4	18,822	857
February	15,192	14,578	28.1	18,490	946
March	14,462	15,601	28.9	16,450	901
April	13,884	15,607	30.1	14,046	1,140
May	15,793	14,693	28.4	14,647	890
June	16,052	14,414	27.8	14,535	1,077
July	16,241	12,128	27.3	17,682	1,240
August	16,543	13,227	31.9	19,706	....
September	16,410	13,681	31.2	21,597	....

*Stocks on hand the last of the month or year. †Corrected to 100% from estimate of reported coverage.
Compiled by The Rubber Manufacturers Association, Inc.

CONSUMPTION of reclaim during September is estimated at 13,681 tons as compared with 13,227 tons in August and 12,128 in July, according to The Rubber Manufacturers Association, Inc. The demand continued active during October, with indications for an increased demand during the next few months. Prices for reclaimed rubber remain at the same levels as last month.

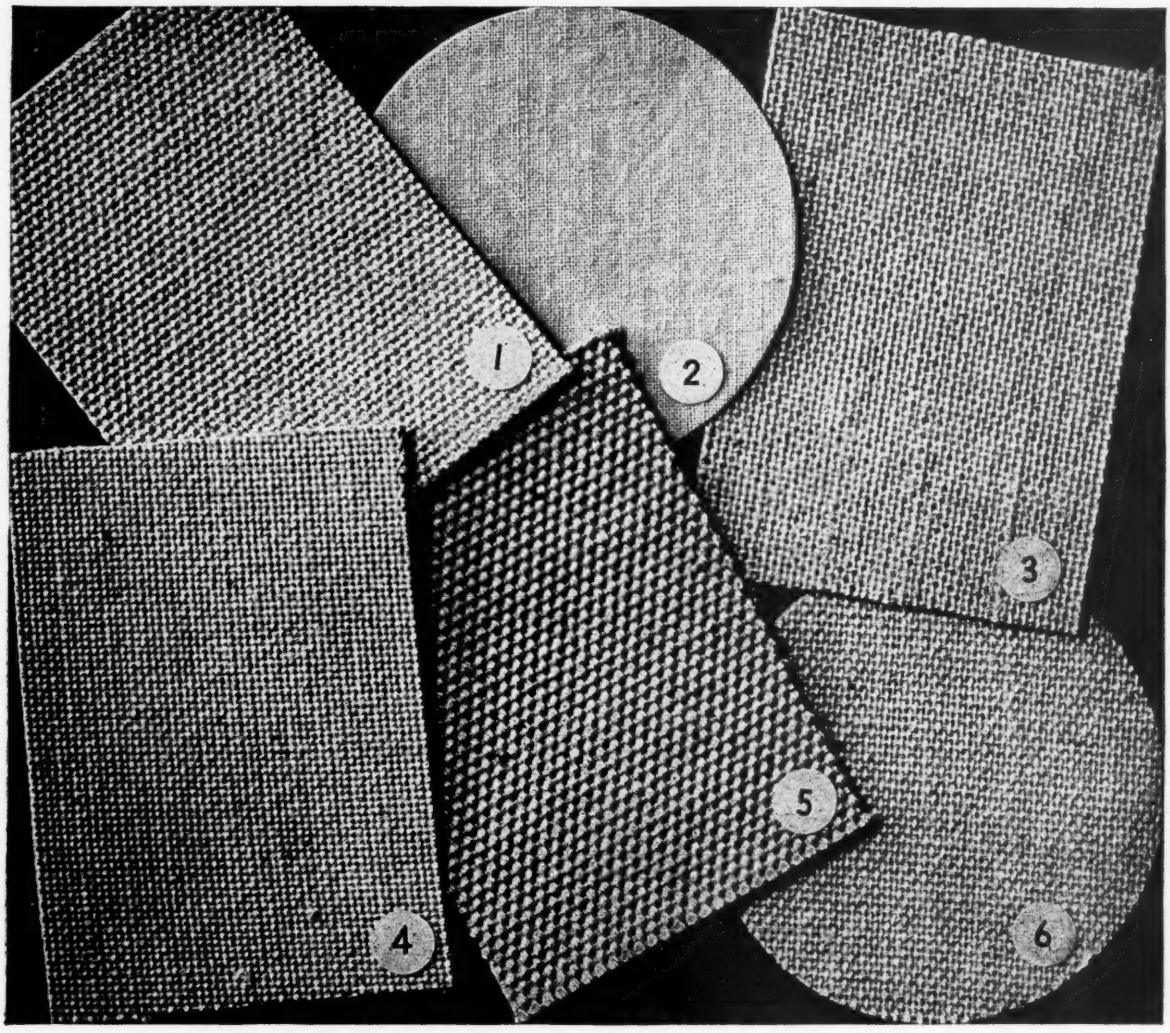
New York Quotations

October 22, 1937

	Sp. Grav.	¢ per lb.
Auto Tire		
Black Select	1.16-1.18	6¼/ 6½
Acid	1.18-1.22	7¼/ 7½
Shoe		
Standard	1.56-1.60	7 / 7¼
Tube		
No. 1 Floating	1.00	19 /19¼
Compounded	1.10-1.12	10½/11
Red Tube	1.15-1.30	10½/11
Miscellaneous		
Mechanical Blends	1.25-1.50	4½/ 5
White	1.35-1.50	15 /15½

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

A RECENT SURVEY BY THE NATIONAL Industrial Conference Board indicates that four out of every ve companies have adopted some form of training for industrial work to meet present and future needs of skilled workers.



FABRICS for use with RUBBER

With many years of experience in working with the engineers and purchasing agents of the leading rubber companies, we are in position to supply both standard and special fabrics to suit your particular needs. Seventeen mills and adequate engineering and laboratory facilities assure you of technical excellence and ultimate economy. The fabrics illustrated above are identified by number below.

1. OCEANIC Numbered Duck **2. COLUMBUS Sheeting** **3. WEST POINT Osnaburg**
4. WEST POINT Chafer Fabric **5. SHAWMUT Belting Duck** **6. SHAWMUT Hose Duck**

WELLINGTON SEARS COMPANY

65 WORTH STREET **NEW YORK CITY**

Statement of "India Rubber World"

Statement of the ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of INDIA RUBBER WORLD, published monthly at New York, N. Y., for October 1, 1937.

State of New York } ss.
County of New York }

Before me, a notary public in and for the State and county aforesaid, personally appeared S. C. Stillwagon, who, having been duly sworn according to law, deposes and says that he is the Editor of INDIA RUBBER WORLD and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: publisher, Bill Brothers Publishing Corp., 420 Lexington Ave., New York, N. Y.; editor, S. C. Stillwagon, 420 Lexington Ave., New York, N. Y.; managing editor, S. C. Stillwagon, 420 Lexington Ave., New York, N. Y.; business manager, B. Brittain Wilson, 420 Lexington Ave., New York, N. Y.

2. That the owner is: Bill Brothers Publishing Corp., Caroline L. Bill, Raymond Bill, Edward Lyman Bill, and Randolph Brown, all located at 420 Lexington Ave., New York, N. Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1% or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

S. C. STILLWAGON,
Editor

Sworn to and subscribed before me this 30th day of September, 1937.

[SEAL]

WM. A. LOW.

Notary Public Queens Co. No. 1161. Reg. No. 4973. Certificate filed in N. Y. Co. No. 761. Reg. No. 9L464.

(Commission expires March 30, 1939)

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Trafalgar Sq., London, W.C.2, England, gives the following figures for September, 1937:

Rubber Exports: Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

To	Sheet and Crepe Rubber Tons	Latex, Concentrated Latex, Revertex, and Other Forms of Latex Tons
United Kingdom	7,813	526
United States	38,958	556
Continent of Europe	10,668	406
British possessions	6,506	86
Japan	1,169	11
Other countries	713	2
Totals	65,827	1,587

Rubber Imports: Actual, by Land and Sea

From	Dry Rubber Tons	Wet Rubber (Dry Weight) Tons
Sumatra	7,672	1,168
Dutch Borneo	2,961	189
Java and other Dutch islands	813	6
Sarawak	2,672	...
British Borneo	292	24
Burma	89	6
Siam	2,259	540
French Indo-China	151	101
Other countries	113	9
Totals	17,022	2,043

U. S. Crude and Waste Rubber Imports for 1937

	Plantations	Latex	Paras	Africans	Centrals	Manicoba and Guayule	Matto Grosso	Totals 1937	Totals 1936	Balata	Miscellaneous	Waste
Jan. ....tons	30,674	1,171	625	167	23	160	..	32,820	31,292	13	383	201
Feb.	40,326	2,100	717	15	2	129	..	43,289	35,219	37	1,300	217
Mar.	48,367	2,117	1,285	47	11	212	..	52,039	37,451	21	894	572
April	33,147	1,683	734	79	17	190	..	35,850	40,370	6	283	99
May	48,196	1,809	612	46	2	175	..	50,840	35,598	44	669	868
June	45,680	2,678	318	70	22	188	..	48,956	41,835	47	641	374
July	36,315	2,154	140	75	11	413	..	39,108	35,881	44	726	307
Aug.	46,627	1,460	120	283	2	293	..	48,785	42,562	14	513	266
Sept.	53,942	1,395	229	146	8	329	..	56,049	48,386	55	738	72
Total 9 mos., 1937 ....tons	383,274	16,567	4,780	928	98	2,089	..	407,736	.....	281	6,147	2,976
Total 9 mos., 1936 .....tons	331,776	11,720	3,157	862	258	821	..	.....	348,594	882	6,079	1,716

Compiled from The Rubber Manufacturers Association, Inc., statistics.

United States Latex Imports

Year	Pounds	Value
1934	29,276,134	$3,633,253
1935	30,358,748	3,782,222
1936	44,469,504	6,659,899
1937		
Jan.	2,995,027	535,546
Feb.	4,418,474	775,202
Mar.	4,962,915	968,033
Apr.	3,658,660	724,757
May	4,470,572	941,235
June	5,737,563	1,253,370
July	4,302,503	924,127
Aug.	4,033,306	838,778

Data from Leather and Rubber Division, United States Department of Commerce, Washington, D. C.

World Net Imports of Crude Rubber

Year	U.S.A.	U.K.†	Australia	Belgium	Canada	Czechoslovakia	France	Germany	Italy	Japan	Russia	Rest of the World	Total
1935	455,800	175,100	10,000	7,600	26,900	11,200	52,300	62,900	26,100	57,600	37,600	59,100	935,900
1936	475,361	62,676	14,423	9,627	27,867	8,772	56,777	71,793	16,534	61,701	30,967	64,647	831,684
1937													
Jan.	42,655	3,855	590	854	1,632	567	4,701	7,041	1,770	8,298	2,633	5,959	76,458
Feb.	44,398	6,081	331	1,363	1,271	837	5,276	7,911	1,502	6,605	3,048	5,068	77,388
Mar.	39,888	7,197	1,293	1,641	2,612	601	5,359	7,668	2,119	6,914	3,598	6,172	78,208
Apr.	42,066	9,871	1,058	1,069	1,343	1,445	5,302	8,664	1,669	5,808	1,532	5,843	79,607
May	48,506	8,488	1,287	2,113	4,187	925	5,619	6,706	2,771	8,597	1,886	6,244	94,941
June	48,972	10,437	2,258	1,630	3,790	1,150	6,022	6,469	1,958	7,608	3,940	6,166	95,120
July	43,018	13,854	1,959	851	2,000*	754	5,000*	7,860	2,719	4,869	2,150	5,742	87,550

*Estimate. †U.K. figures show gross imports, not net imports. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

Shipments of Crude Rubber from Producing Countries

Year	Malaya including Brunei and Labuan	N.E.I.	Ceylon	India	Burma	North Borneo	Sarawak	Siam	French Indo-China	Total	Philippines and Oceania	Africa	South America	Mexican Guayule	Grand Total
1935	417,000	282,900	54,300	9,100	4,900	8,900	19,300	28,300	28,700	853,400	1,500*	5,000	12,200	500	872,600
1936	353,667	309,641	49,685	8,648	5,859	8,177	21,013	34,578	40,769	832,037	1,619*	6,122	14,632	1,228	855,638
1937															
Jan.	24,746	27,132	4,514	487	579	1,234	4,015	3,849	2,827	69,383	80	635	1,286	160	71,544
Feb.	24,138	26,770	5,603	1,033	843	790	2,015	3,554	3,077	67,823	180	537	1,789	206	70,535
Mar.	40,138	40,929	7,049	885	1,149	1,239	1,425	3,873	3,173	99,860	181	472	1,792	136	102,441
Apr.	41,696	33,136	3,419	627	559	783	2,960	1,899	2,095	87,174	124	574	1,546	190	89,608
May	33,929	38,828	4,607	445	562	778	742	2,238	2,888	85,017	98	676	1,057	182	87,030
June	31,376	47,387	5,149	662	430	813	1,890	2,933	3,673	94,313	117	621	915	145	96,111
July	45,900	44,240	6,279	703	263	1,414	2,543	3,195	5,563	110,100	200*	600*	949	413	112,262
Aug.	43,281	40,608	7,313	498	134	1,189	1,624	2,999	2,272	99,918	200*	600*	1,314	200*	102,232

*Estimate. Source: *Statistical Bulletin of the International Rubber Regulation Committee.*

CLASSIFIED ADVERTISEMENTS

ALL CLASSIFIED ADVERTISING MUST BE PAID IN ADVANCE

GENERAL RATES	SITUATIONS WANTED RATES	SITUATIONS OPEN RATES
Light face type $1.00 per line (ten words)	Light face type 40c per line (ten words)	Light face type 75c per line (ten words)
Bold face type $1.25 per line (eight words)	Bold face type 55c per line (eight words)	Bold face type $1.00 per line (eight words)

Allow nine words for keyed address. *Replies forwarded without charge.*

SITUATIONS WANTED

RUBBER CHEMIST: B. S. UNIVERSITY OF AKRON, 1936. HALF year's experience in compounding laboratory. Excellent references. Address Box No. 885, care of INDIA RUBBER WORLD.

CHEMIST-SALESMAN

14 years' diversified experience in research, production, and sales in the rubber and plastics industries. Desires permanent position with reliable company. Address Box No. 888, care of INDIA RUBBER WORLD.

PRACTICAL PRODUCTION EXECUTIVE WITH 18 YEARS' EXperience manufacturing mechanicals, both hard and soft rubber, extruded goods and automotive products. Competent to train inexperienced help and develop formulae, also handle production schedules on an efficient economical basis. Age 40. Available on short notice. Address Box No. 889, care of INDIA RUBBER WORLD.

EXECUTIVE, NOW EMPLOYED, DESIRES CHANGE. NINETEEN years' experience in all phases of the manufacture of tires, tubes, and mechanical rubber goods. Competent to take charge of development department, to originate new compounds, to handle factory cost, specifications and estimating department, or to superintend factory. Address Box No. 891, care of INDIA RUBBER WORLD.

RUBBER CONSULTANT OR EXECUTIVE: 30 YEARS' EXPERIence in manufacture of rubber and complete knowledge of compounding. Good pricer. Specializing in mechanical line, molded goods, hose, belting, asbestos friction lining, roll covering. Electrical and cable tape. Sponge rubber. Have own following, involving considerable monthly business. Address Box No. 892, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

WANTED: TECHNICALLY TRAINED RUBBER MAN FOR ORGANIC color sales to contact rubber manufacturers in seaboard territory, also plant laboratory work. Address Box No. 877, care of INDIA RUBBER WORLD.

WANTED: A SALESMAN TO HANDLE MOLDED HARD RUBBER products as a side line. Address Box No. 882, care of INDIA RUBBER WORLD.

SITUATIONS OPEN—Continued

RUBBER CHEMIST, 27 YEARS OLD, ABOUT FOUR YEARS' experience in production and compounding. State age, education, experience, and salary expected. Opportunity for advancement. Address Box No. 878, care of INDIA RUBBER WORLD.

WANTED: RUBBER CEMENT CHEMIST FAMILIAR WITH adhesives and resins. Detail past experience. All replies confidential. Address Box No. 880, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

WANTED: MANUFACTURERS WITH FACILITIES TO MAKE hard and soft rubber vacuum cleaner wheels as a competitive price basis; quantity. Address Box No. 879, care of INDIA RUBBER WORLD.

WANTED TO BUY OR LEASE: SMALL RUBBER PLANT NEAR Boston. State price, equipment, etc., in first letter. Address Box No. 886, care of INDIA RUBBER WORLD.

MACHINERY AND SUPPLIES FOR SALE

BANBURY MIXER FOR SALE. LABORATORY MIDGET MODEL complete with motor. Slightly used; perfect condition. Address Box No. 881, care of INDIA RUBBER WORLD.

H.P.M. PUMPS AND BUTTERWORTH DRIERS: FOUR BRAND new H.P.M. high-pressure, vertical, hydraulic pumps, two 3 by 12", two 6 by 12", and five brand new 8-drum, 23 by 62" Butterworth drum driers. Address Box No. 884, care of INDIA RUBBER WORLD.

FOR SALE: ONE 3-ROLL 54" CALENDER; ONE 2-ROLL 24" calender; two steam vulcanizers with tracks; one 26" by 26" vulcanizing press, hand screw; and other rubber accessories. Address Box No. 887, care of INDIA RUBBER WORLD.

FOR SALE: COMPLETE LINE OF USED RUBBER EQUIPMENT including mills, calenders, hydraulic presses, vulcanizers, Banbury mixers, driers, etc. Send for complete list. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York, N. Y.

GUAYULE RUBBER
Washed and Dry, Ready for Compounding
PLANTATION RUBBER
From Our Own Estates in Sumatra
CONTINENTAL RUBBER COMPANY OF NEW YORK
745 Fifth Avenue New York

Thoroughly Rebuilt and Guaranteed
RUBBER MILL MACHINERY
We Operate Our Own Machine Shops

Accumulators
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Cutting Machines
Spreaders
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AKRON, OHIO
European Office and Representative:
Mr. Andre Berjonneau, No. 33 Blvd. des Batignolles, 33, Paris (VIII) France.

L. ALBERT & SON

(*Advertisements continued on page 91*)

Rubber Goods Production Statistics

		1937	1936
TIRES AND TUBES			
Pneumatic casings		July	July
Production	thousands	4,292	5,465
Shipments, total	thousands	5,190	5,744
Domestic	thousands	5,112	5,678
Stocks, end of month	thousands	11,654	7,746
Inner tubes			
Production	thousands	4,019	5,177
Shipments, total	thousands	5,046	5,758
Domestic	thousands	4,993	5,544
Stocks, end of month	thousands	10,869	7,725
Raw material consumed			
Fabrics	thous. of lbs.	18,494	22,532
MISCELLANEOUS PRODUCTS			
Single and double texture proofed fabrics			
Production	thous of yds.	3,380	3,667
Rubber and canvas footwear			
Production, total	thous. of prs.	4,679	4,571
Tennis	thous. of prs.	1,584	1,244
Waterproof	thous. of prs.	3,095	3,327
Shipments, total	thous. of prs.	5,764	5,431
Tennis	thous. of prs.	2,075	2,034
Waterproof	thous. of prs.	3,689	3,397
Shipments, domestic, total	thous. of prs.	5,738	5,407
Tennis	thous. of prs.	2,055	2,018
Waterproof	thous. of prs.	3,683	3,390
Stocks, total, end of month	thous. of prs.	21,729	17,962
Tennis	thous. of prs.	4,404	3,729
Waterproof	thous. of prs.	17,326	14,233

The above figures have been adjusted to represent 100% of the industry based on reports received which represented 81% for 1936-37.

Source: *Survey of Current Business*, Bureau of Foreign & Domestic Commerce, Washington, D. C.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Collyer Insulated Wire Co..	Com.	$0.35	Oct. 1	Sept. 23
Dayton Rubber Mfg. Co.....	Class A	$1.00 accum	Oct. 28	Oct. 21
Fisk Rubber Corp.	Pfd.	$1.50 q.	Oct. 20	Oct. 11
General Tire & Rubber Co...	Com.	$0.50 special	Nov. 10	Oct. 29
Lee Rubber & Tire Corp....	Com.	$0.60 irregular	Oct. 26	Oct. 15
Okonite Co.	Com.	$1.00 extra	Nov. 1	.....
Okonite Co.	Com.	$1.50	Nov. 1	.....
Plymouth Rubber Co., Inc...	7% Pfd.	$1.75 q.	Oct. 15	Oct. 1

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

No.	COMMODITY	CITY AND COUNTRY
*4,182	Automobile and truck parts.....	Marseille, France
†4,197	Sheet material for rubber bands.....	Buenos Aires, Argentina
*4,199	Hospital, dental, and surgical supplies.	London, England
*4,214	Automobile and truck parts.....	Bogota, Colombia
‡4,239	Druggists' sundries	Rio de Janeiro, Brazil
*4,242	Novelties	Cairo, Egypt
‡4,260	Novelties and sundries	Gibraltar, Spain
*4,273	Automobile parts	Bombay, India
*4,297	Druggists' sundries	Bogota, Colombia
*4,324	Automobile and truck parts.....	Mexico City, Mexico
†4,360	Rubber bands	Ghent, Belgium
†4,383	Toys	Guatemala City, Guatemala

*Agency. †Purchase. ‡Purchase and agency.

Rims Approved by The Tire & Rim Association, Inc.

Rim Size	9 Mos., 1937 No.	%	9 Mos., 1936 No.	%
Drop Center Rims, 16" Diameter and Under				
15x5.50E	.....	..	1,532	..
16x4.00D	11,098	0.1	5,455	0.0
16x4.25D	277,238	1.5	178,650	1.2
16x4.50D	.....	..	33,753	0.2
16x6.00E	.....	..	77	0.0
15x5.00F	931	0.0	11,828	0.1
15x5.50F	217,196	0.1	113,294	0.8
16x3.50D	1,479,722	8.5	1,088	0.1
16x4.00E	7,117,358	40.8	5,585,434	37.7
16x4.25E	928,849	5.3	317,578	2.1
16x4.50E	2,766,085	15.8	2,056,889	13.8
16x5.00F	898,622	5.1	601,582	4.1
16x5.50F	132,921	0.8	62,019	0.4
16x6.00F	21,198	0.1	10,304	0.1
Drop Center Rims, 17" Diameter and Over				
17x3.00D	5,785	0.0	102,445	0.7
17x3.25E	44,165	0.3	488,614	3.0
17x3.62F	38,729	0.2	2,166,823	14.6
17x4.00F	356	0.0	14,859	1.0
17x4.19F	959	0.0	4,008	0.0
17x5.00F	5,745	0.0	4,456	0.0
18x2.15B	25,451	0.1	42,742	0.3
18x3.00D	4,312	0.0	646	0.0
18x3.25E	8,968	0.0	8,349	0.1
18x3.62F	40,747	0.2	4,928	0.0
18x4.00F	4,760	0.0	1,221	0.0
18x4.19F	21,109	0.1	18,538	0.1
19x2.15B	1,405	0.0	5,727	0.0
19x3.00D	2,703	0.0	8,311	0.1
19x3.25E	701	0.0	12,048	0.1
19x3.62F	6,537	0.0	...	..
20x3.25E	12,963	0.1	12,159	0.1
21x3.25E	15,613	0.1	4,693	0.0
22x3.25E	986	0.0	...	..
Flat Base Passenger Rims				
All Sizes	24,059	0.1	48,193	0.3
High Pressure Rims				
All Sizes	1,120	0.0	1,273	0.0
15" Truck Rims				
15x7	4,354	0.0	4,715	0.0
15x8	2,052	0.0	1,135	0.0
17" Truck Rims				
17x6	25,203	0.1	...	..
18" Truck Rims				
18x5	.....	..	524	0.0
18x6	6,813	0.0	2,389	0.0
18x7	39,992	0.2	31,426	0.2
18x8	6,175	0.0	1,859	0.0
18x9/10	6,022	0.0	3,170	0.0
20" Truck Rims				
20x5	838,553	4.8	965,498	6.5
20x6	1,375,937	7.9	1,193,734	8.1
20x7	386,336	2.2	337,259	2.3
20x8	156,152	0.9	125,364	0.8
20x9/10	25,653	0.1	14,533	0.1
20x10.50	.....	..	688	0.0
20x11	2,558	0.0	1,118	0.0
22" Truck Rims				
22x7	257	0.0	177	0.0
22x8	15,976	0.1	13,142	0.1
22x9/10	5,389	0.0	6,261	0.0
24" Truck Rims				
24x5	101	0.0	.....	..
24x6	3,896	0.0	2,518	0.0
24x7	5,408	0.0	9,575	0.1
24x8	12,025	0.1	14,608	0.1
24x9/10	13,139	0.1	10,253	0.1
24x11	3,121	0.0	2,732	0.0
Drop Center Tractor Rims				
24x6.00S	16,970	0.1	4,320	0.0
24x8.00T	56,366	0.3	40,657	0.3
28x6.00S	2,302	0.0	1,385	0.0
28x8.00T	59,608	0.3	25,293	0.2
32x6.00S	.....	..	1,052	0.0
32x8.00T	7,839	0.0	3,348	0.0
36x6.00S	53,326	0.3	41,948	0.3
36x8.00T	43,951	0.2	8,945	0.1
40x6.00S	16,941	0.1	4,264	0.0
40x8.00T	5	0.0	123	0.0
42x8.00T	416	0.0	.....	..
44x8.00T	585	0.0	51	0.0
12x3.00D	4,495	0.0	.....	..
15x3.00D	78,570	0.5	26,952	0.2
16x3.00D	355	0.0	385	0.0
18x3.00D	652	0.0	.....	..
18x5.50F	5,713	0.0	.....	..
19x3.00D	307	0.0	.....	..
20x4.50E	10,014	0.1	547	0.0
20x5.00F	.....	..	21	0.0
20x5.50F	5,359	0.0	.....	..
21x3.00D	3,041	0.0	.....	..
22x4.50E	1,336	0.0	.....	..
28x4.00D	28	0.0	.....	..
36x3.00D	1,303	0.0	594	0.0
36x4.50E	1,520	0.0	394	0.0
41x4.50E	17	0.0	.....	..
Cast Rims				
10x5.00F	2,565	0.0	1,413	0.0
10x6.00F	1,052	0.0	451	0.0
12x2.50D	166	0.0	.....	..
24x15	381	0.0	463	0.0
Clinchers				
All Sizes	4,720	0.0	4,366	0.0
Airplane				
All Sizes	1,289	0.0	1,224	0.0
Totals	17,428,695	..	14,828,390	..

New York Quotations

(*Continued from page 84*)

Softeners for Hard Rubber Compounding		
Resin C Pitch 55° C. M.P.	lb.	$0.013 /$0.014
Resin C Pitch 70° C. M.P.	lb.	.013 / .014
Resin C Pitch 85° C. M.P.	lb.	.013 / .014
Solvents		
Beta-Trichlorethane	gal.	
Bondogen	lb.	
Carbon bisulphide	lb.	
tetrachloride	lb.	
Industrial 90% benzol (tank car)	gal.	.16
Stabilizers for Cure		
Laurex, ton lots	lb.	
Stearex B	lb.	.11 / .12
Beads	lb.	.10 / .11
Stearic acid, single pressed	lb.	.11 / .12
Stearic 100	lbs.	10.00 /11.00
Zinc stearate	lb.	.23
Synthetic Rubber		
Neoprene Latex Type 50	lb.	
53	lb.	
54	lb.	
Type E.	lb.	
"Thiokol" A (f.o.b. Yardville)	lb.	.35
Coating Materials	gal.	2.50 / 5.00
DX	lb.	.55
Molding Powder	lb.	.50 / .75
Tackifier		
B. R. H. No. 2	lb.	.015 / .016
Varnish		
Shoe	gal.	1.45
Vulcanizing Ingredients		
Sulphur		
Chloride, drums	lb.	.03½/ .04
Rubber 100	lb.	2.65
Telloy	lb.	
Vandex	lb.	
(See also Colors—Antimony)		
Waxes		
Carnauba, No. 3 chalky	lb.	.37½
2 N.C.	lb.	.39¼
3 N.C.	lb.	.37½
1 Yellow	lb.	.45¾
2	lb.	.44¼
Montan, crude	lb.	.11

London and Liverpool Stocks

Week Ended	Tons London	Liverpool
October 2	28,469	21,320
October 9	29,324	21,215
October 16	29,555	20,744
October 23	29,985	21,339

Classified Advertisements

Continued

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MISCELLANEOUS

WANTED: SOURCE HARD BALATA RESIN OR similar resin. Address Box No. 893, care of INDIA RUBBER WORLD.

FOSTER D. SNELL, INC.
Chemists—Engineers
Every form of Chemical Service
305 Washington Street Brooklyn, N. Y.
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ANY DIAMETER, ANY LENGTH
The W. F. Gammeter Co., Cadiz, Ohio

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RUBBER SPECIALTIES
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Division of Ideal Novelty & Toy Co., Inc.
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LET US—TREAT YOUR LINERS
Advantages of Porotex Treatment
1. All compounds stripped easily.
2. Wrinkles never cause liners to crack.
3. Liners do not rot as treatment renders them heat-proof and oil-proof.
4. Liners remain porous, reducing tendency to trap air.

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MOLDED RUBBER GOODS
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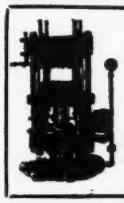
SANDUSKY, OHIO

Deresinated and Precipitated Surinam
BALATA
Refined approximately 99%
Purer and cheaper than you can produce it and you avoid the ever present fire risk. Dependable deliveries. Sample on request.
HUNTINGDON MANUFACTURING CO.
MEADOWBROOK, PA.



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Plain or Semi-automatic—Any Size or pressure—Pumps, Valves, etc.
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(SOLID OR GRANULATED)
A hard, stable compound—produced under the exacting supervision of an experienced and up-to-date laboratory. Aging tests have proved Genasco to be *always* of uniform quality. Shipped to all parts of the world in metal drums. Stocks carried at Maurer, N. J. and Madison, Ill.
THE BARBER COMPANY, INC.
New York Philadelphia Madison, Ill. Chicago

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Manufacturers of
SPIRAL WRAPPING MACHINES
for
COILS OF STEEL, WIRE AND HOSE
Write for Particulars
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MILLS, CALENDERS, TUBERS, HYDRAULIC PRESSES, PUMPS, VULCANIZERS, TIRE MAKING EQUIPMENT, MOULDS, ETC.
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BROCKTON TOOL COMPANY
103 Belmont Street QUALITY MOULDS FOR ALL PURPOSES Brockton, Mass.
THE FIRST STEP — A QUALITY MOULD

ADVERTISING PAGES REMOVED

United States Statistics

Imports for Consumption of Crude and Manufactured Rubber

	July, 1937		Seven Months Ended July, 1937	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	92,944,625	$19,010,273	672,420,333	$129,501,857
Liquid latex	4,302,503	924,127	30,545,714	6,122,290
Jelutong or pontianak	1,914,110	158,998	8,212,470	880,706
Balata	48,569	9,363	547,318	110,317
Gutta percha	149,058	24,967	1,191,243	234,786
Guayule	831,600	106,360	3,111,000	387,181
Siak	42,946	3,919	222,683	19,074
Scrap and reclaimed	1,361,805	45,472	8,804,734	260,403
Totals	101,595,216	$20,283,479	725,055,495	$137,516,614
Chicle, crude—*Free*	298,680	$79,682	7,519,677	$2,148,585
MANUFACTURED—*Dutiable*				
Rubber tires—*number*	8,903	$9,308	46,138	$89,016
Rubber boots, shoes, and overshoes—*pairs*	2,791	1,050	22,199	10,681
Rubber soled footwear with fabric uppers—*pairs*	101,523	31,775	577,294	156,507
Golf balls—*number*	26,928	2,996	457,410	52,317
Lawn tennis balls—*number*	3,120	306	301,830	26,186
Other rubber balls—*number*	264,056	12,636	3,914,789	131,347
Other rubber toys, except balls	61,518	9,347	556,928	78,872
Hard rubber combs—*number*	30,456	1,702	471,776	30,334
Other manufactures of hard rubber	.....	5,153	.....	23,706
Friction or insulating tape	10,110	492	106,285	5,954
Belts, hose, packing, and insulating material	.....	26,749	.....	153,247
Druggists' sundries of soft rubber	.....	7,228	.....	48,249
Inflatable swimming belts, floats, etc.—*number*	16,861	802	864,534	57,534
Other rubber and gutta percha manufactures—*lb.*	140,007	33,674	1,044,727	228,710
Totals	.....	$143,218	.....	$1,092,660

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	1,718,453	$300,301	12,796,299	$2,509,638
Balata	75,758	21,044	490,725	142,279
Gutta percha, rubber substitutes, and scrap	4,182	1,500	446,154	97,675
Rubber manufactures	.....	5,528	.....	16,514
Totals	.....	$328,373	.....	$2,766,106

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed—*lb.*	2,734,659	$132,662	15,643,937	$716,268
Scrap—*lb.*	7,679,603	171,353	51,191,482	997,879
Cements—*gal.*	20,483	18,331	202,571	177,474
Rubberized automobile cloth, *sq. yd.*	63,875	27,543	391,165	172,840
Other rubberized piece goods and hospital sheeting—*sq. yd.*	158,522	63,516	1,119,055	479,105
Footwear				
Boots—*pairs*	6,120	13,377	58,202	132,355
Shoes—*pairs*	10,762	4,882	168,160	85,277
Canvas shoes with rubber soles—*pairs*	50,081	29,795	291,959	170,661
Soles—*doz. prs.*	2,852	9,029	23,169	46,181
Heels—*doz. prs.*	47,093	30,812	386,023	229,005
Soling and top lift sheets	12,992	3,306	424,217	79,682
Gloves and mittens—*doz. prs.*	5,287	12,777	49,252	107,689
Water bottles and fountain syringes—*number*	53,924	22,459	169,889	66,299
Other druggists' sundries	.....	53,951	.....	338,879
Gum rubber clothing—*doz.*	38,629	51,077	207,210	344,836
Balloons—*gross*	40,092	30,047	272,361	196,515
Toys and balls	.....	22,537	.....	82,448
Bathing caps—*doz.*	4,733	7,675	41,437	64,202
Bands—*lb.*	22,189	9,737	170,194	68,813
Erasers—*lb.*	40,455	22,444	243,143	139,380
Hard rubber goods				
Electrical battery boxes	24,375	16,914	182,345	104,290
Other electrical—*lb.*	16,267	3,931	281,715	61,492
Combs, finished—*doz.*	14,604	8,737	75,934	48,198
Other hard rubber goods	.....	21,220	.....	140,837
Tires				
Truck and bus casings, *number*	14,353	345,978	112,333	2,245,326
Other automobile casings, *number*	65,850	703,676	488,012	5,126,071
Tubes, auto—*number*	51,348	74,378	387,237	584,460
Other casings and tubes, *number*	6,365	48,038	46,380	350,110
Solid tires for automobiles and motor trucks—*number*	147	6,354	2,618	72,336
Other solid tires	98,235	15,771	630,758	97,936
Tire sundries and repair materials	.....	94,789	.....	522,440
Rubber and friction tape—*lb.*	60,230	17,750	492,923	130,570
Fan belts for automobiles—*lb.*	89,159	51,689	477,928	266,956
Other rubber and balata belts—*lb.*	248,475	135,620	1,926,976	1,002,655
Garden hose—*lb.*	78,792	15,075	596,206	119,916
Other hose and tubing—*lb.*	529,948	215,037	3,261,067	1,243,671
Packing	160,727	69,858	1,100,812	475,987
Mats, matting, flooring, and tiling	92,096	16,229	706,684	108,960
Thread	45,983	26,473	535,530	259,244
Gutta percha manufactures	150,367	44,318	725,522	206,730
Other rubber manufactures	.....	98,305	.....	806,272
Totals	.....	$2,767,450	.....	$18,670,245

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	June, 1937		Three Months Ended June, 1937	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude rubber, etc.	8,488,643	$1,812,491	20,877,009	$4,409,266
Gutta percha	3,393	2,105	5,914	4,062
Rubber, recovered	1,343,200	66,439	3,678,300	172,622
Rubber, powdered, and gutta percha scrap	243,400	2,754	1,176,600	20,806
Balata	2,487	547	4,327	1,179
Rubber substitute	48,600	7,957	121,100	23,452
Totals	10,129,723	$1,892,293	25,863,250	$4,631,387
PARTLY MANUFACTURED				
Hard rubber comb blanks	.....	$187	.....	$443
Hard rubber tubes	.....	.....	.....	.....
Hard rubber, n. o. s.	7,662	4,911	116,719	34,922
Rubber thread not covered	2,477	2,823	10,115	7,621
Totals	10,139	$7,921	126,834	$42,986
MANUFACTURED				
Bathing shoes—*pairs*	12,396	$2,762	30,749	$7,236
Belting	.....	10,345	.....	30,462
Hose	.....	10,387	.....	26,690
Packing	.....	5,938	.....	18,784
Boots and shoes—*pairs*	1,715	823	13,168	4,848
Canvas shoes with rubber soles—*pairs*	68,990	18,208	106,355	28,965
Clothing, including waterproofed	.....	3,620	.....	16,419
Raincoats—*number*	327	1,204	2,549	7,619
Gloves—*dozen pairs*	367	818	835	2,520
Hot water bottles	.....	1,906	.....	4,161
Liquid rubber compound	.....	3,748	.....	12,146
Tires, bicycle—*number*	16,452	5,830	50,405	21,179
Pneumatic—*number*	3,611	36,818	6,413	70,617
Inner tubes—*number*	549	1,037	1,827	2,885
Solid for automobiles and motor trucks—*number*	119	2,382	232	10,034
Other solid tires	.....	3,556	.....	6,595
Mats and matting	.....	4,740	.....	12,945
Cement	.....	6,520	.....	15,514
Golf balls—*dozens*	5,204	12,304	21,719	48,835
Heels—*pairs*	7,607	488	98,835	2,742
Other rubber manufactures	.....	152,470	.....	423,816
Totals	.....	$285,904	.....	$775,012
Totals, rubber imports	.....	$2,186,118	.....	$5,449,385

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Waste rubber	$21,224	.....	$61,197	.....
MANUFACTURED				
Belting	$60,543	.....	$212,503	.....
Canvas shoes with rubber soles	69,288	.....	348,601	.....
Boots and shoes	280,380	.....	837,053	.....
Clothing, including waterproofed	37,254	.....	96,577	.....
Heels	15,120	.....	44,108	.....
Hose	19,557	.....	60,954	.....
Soles	19,988	.....	51,799	.....
Tires, pneumatic	747,225	.....	2,459,002	.....
Not otherwise provided for	5	.....	39	.....
Inner tubes	59,041	.....	196,426	.....
Other rubber manufactures	76,183	$3,187	211,504	$8,211
Totals	$1,384,584	$3,187	$4,518,566	$8,211
Totals, rubber exports	$1,405,808	$3,187	$4,579,763	$8,211

Imports by Customs Districts

	August, 1937—*Crude Rubber		August, 1936—*Crude Rubber	
	Pounds	Value	Pounds	Value
Massachusetts	14,327,408	$2,763,890	7,544,549	$1,158,514
St. Lawrence	.....	.....	4,488	651
New York	73,436,323	13,699,700	63,388,437	9,637,740
Philadelphia	1,071,833	193,767	2,365,786	348,749
Maryland	5,736,249	1,218,166	2,074,244	316,571
Georgia	223,781	46,896	1,026,785	156,884
Mobile	2,339,887	456,434	158,071	21,303
New Orleans	5,525,259	1,106,556	1,966,020	315,798
Los Angeles	8,843,696	1,886,673	14,900,343	1,973,883
San Francisco	498,166	92,786	325,263	47,696
Oregon	15,680	3,079	.....	.....
Michigan	4,972	1,206	.....	.....
Ohio	43,898	15,055	34	7
Colorado	280,000	51,777	179,200	27,259
Totals	112,347,152	$21,529,985	93,933,220	$14,005,055

*Crude rubber including latex dry rubber content